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INVESTOR DECISION-MAKING AND ACCOUNTING INFORMATION WITH EMPHASIS ON THE CONGLOMERATE DISCLOSURE CONTROVERSY

by

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled Investor Decision-Making and Accounting Information with Emphasis on the Conglomerate Disclosure Controversy submitted by John J. Williams in partial fulfilment of the requirements for the degree of Master of Business Administration.

ABSTRACT

The primary purpose of this study is to provide a theoretical framework for evaluating the conglomerate disclosure controversy. Attention is focused specifically on the role of accounting information within the realm of investor decision-making.

Since the conglomerate disclosure controversy involves a demand by investors for segmented financial statements, accounting reports must be first justified as a source of valid information. This aspect is examined by considering behavioral decision theory, portfolio theory, and stock market price behavior to establish the major decision variables, the decision criteria, and the importance of accounting information. Next, and equally important, is the need to assess which measurement criteria are most useful for communicating the required data. Various capital maintenance concepts and asset valuation rules are examined to cast light on this issue.

The study concludes that under the current state of generally accepted accounting principles investors' claims for segmented financial statements should be held in abeyance. This conclusion is based on the summation of a positive and negative effect. On the positive side, financial statements are justifiable as a vital source of information for investor decision-making. They contain decision variables appropriate for forming expectations of risk and return which are prerequisites to investors' goal attainment. Segmented financial statements would facilitate this end. From the negative side, the usefulness of financial statements in reducing the distortion in expectations of risk and

return is seriously suspect because of measurement difficulties. Reports prepared under the historical cost convention promulgate data that is not comparable, inhibit proper evaluation of management, and do not reflect the current economic position of the firm. Segmenting total entity historical cost figures will not resolve these discrepancies.

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CHAPTER I

INTRODUCTION

Financial statements currently seem to occupy a position of importance to individual investors and security analysts. Financial reports have attained this level of prominence because they are considered to be a vital means of communicating economic information necessary for intelligent investment decision-making.

Part of the impetus for increased disclosure demanded by investors can be traced to the emergence and growth in recent years of the large multi-divisional companies, or "conglomerates" as they are more commonly labelled. The primary argument advanced by investors relates to the varying degrees of risk, past profits, and growth potential inherent in the different activities of these companies. When the total entity basis is used for reporting the financial operations of such "conglomerates", the above decision variables cannot be isolated and thus informed judgments about the future price of securities are impaired. Accounting also has as an objective the reporting of past data so as to indicate the past performance of managers. Hence, investors conclude that the disclosure of segmented data in the financial statements of conglomerates would provide the necessary information for purposive action.

The accounting profession has long been cognizant of the criticism directed at the communication of information via financial statements. As is the case with most disciplines, a body of knowledge exists in accounting which contains the fundamental principles of the profession. Usually the postulates, concepts, and assumptions, associ-

ated with the ideologies of the various disciplines receive universal recognition only after rigorous research has established their validity. It seems logical that any significant changes in reporting standards or practices which are being demanded by investors should be subjected to the same standards of acceptance.

Unfortunately, the *a priori* arguments and empirical research currently advanced in the literature regarding increased disclosure lack a conceptual foundation. Thus, it is not surprising that the accounting profession has been slow to respond with an exact opinion concerning the conglomerate disclosure controversy.

To generate any compelling evidence for increased disclosure requires that attention first be directed at defining the decision models of users of accounting data. However, resolving this issue alone does not exhaust the problem. A second difficulty is determining what decision variables in the financial statements are most significant to investors and which accounting measure is appropriate in communicating this information.

STATEMENT OF THE PROBLEM

Traditionally, the total entity basis[1] has been the fundamental premise underlying the disclosure of operations in corporate financial reports for external users. As a result of the processes of acquisition, merger, or internal expansion, many corporations are

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[1] The total entity concept refers to the principle of reporting the aggregate dollar total for each classified item in the financial statements without recognizing the breakdown of the items according to criteria such as subsidiary companies, major product lines, markets, *et cetera*.

currently comprised of several companies which disclose their operations under the guise of a single corporate veil. Investors, as external users of financial reports, strongly resent this form of disclosure. They are claiming that such conglomerates should report on a segmented basis so as to provide more adequate and reliable information for investment decision-making. The purpose of this thesis is to develop a theoretical framework as a basis for evaluating the conglomerate disclosure controversy.

METHODOLOGY

This paper employs deductive methods to develop a framework on which to judge the conglomerate disclosure controversy. The use of this method permits a conceptual integration of investor decision models with the basic postulates, principles, and concepts of accounting theory. Accordingly, the author synthesizes concepts developed in complementary disciplines - particularly finance and the behavioral sciences.

LIMITATIONS OF THE STUDY

This thesis does not attempt to suggest rationality in the decision-making process of every investor nor does it purport to develop solutions to the actual implementation of segmented reports for conglomerate companies. It is intended rather to provide some insight into the concepts which currently exist in an attempt to evaluate the relationship between financial information and investor decision-making.

Without reference to the notion that various users of financial reports are of equal importance, the author has chosen to focus

this paper on investors as users of external financial reports. This refinement is to include shareholders and security analysts but excludes bankers and other institutional lenders. Management, government bureaux, trade unions, and any other users of external financial reports are not considered in this paper.

There are two reasons for limiting this paper to investors as users of financial reports. First, the author recognizes that the needs and objectives of various users may be different. Consequently, such users may have different criteria which they perceive to be decision variables. To consider all of these possibilities is simply beyond the scope of this paper.

The second reason is that investors are emphasized in the literature as being one of the most important external users of financial statements. Agreement on this statement seems virtually assured in view of the enormous amount of funds presently controlled by financial institutions who are steadily supported each year through pension plans and various other investment plans.

ORGANIZATION OF THE THESIS

There are seven chapters to the main body of this thesis. Chapter II expounds on the problem initially described in this chapter. Specifically, the needs of investors together with their reasons for desiring segmented reports are contrasted with the intended purpose of external accounting reports. Chapter III then elaborates on the fundamentals of decision-making which provides the framework for discussing investment decision models in Chapter IV. The main emphasis

of both chapters is on the role of information and its significance to the decision variables of risk and return. Chapter V concentrates on the behavior of stock market prices in relation to the ideas developed in the previous two chapters. Special attention is cast on the interdependency of financial statement information and investors' expectations. Chapter VI then deals with alternative accounting measures for communicating information which is crucial to the investment decision process. A summary of the thesis and areas worthy of further study comprise the last chapter.

CONCLUSIONS

Segmented financial statements are justifiable as a vital source of information for investor decision-making. They contain the decision variables appropriate for forming expectations of risk and return which are prerequisites to investors' goal attainment.

However, the usefulness of segmented financial statements in reducing the distortion in expectations of risk and return is suspect because of measurement difficulties. Reports prepared under the historical cost convention promulgate data that is not comparable, inhibit proper evaluation of management, and do not reflect the current economic position of the firm. These discrepancies may be remedied by incorporating other modes of measurement. Factorizing total entity historical cost figures will not necessarily resolve these discrepancies.

The summation of these two effects, the first positive and the second negative, leads to the conclusion that segmented historical cost financial statements will not significantly benefit the decision

process of investors. It would appear that under such a measurement system investors do not have a proper foundation for reducing the distortion in formulating risk applicable to a portfolio of securities. This is mainly due to the adverse features of the historical cost measurement system mentioned above. If it seems unlikely that any significant reductions in the distortion of expected risk calculations will not occur through the use of segmented historical cost information, then it is improbable that investors would move in the direction of goal attainment. Hence, the benefits from segmented financial reports would not appear to outweigh the costs. Therefore, under the current state of generally accepted accounting principles which adhere to the historical cost convention, the investors' claims for segmented financial statements should be rejected.

CHAPTER II

SUMMARY OF THE LITERATURE

This chapter examines the issues relevant to the conglomerate disclosure controversy and the corresponding relationship of such issues to the purpose of accounting information. First, the concept of "conglomerate" is defined, followed by a discussion of investor and management positions on providing segmented data in conglomerate financial reports. Next, the purpose of accounting information is stressed followed by an analysis of the deficiencies inherent in the demand by investors for more information.

The primary purpose of the chapter is to provide some insight into the complexity of the conglomerate disclosure controversy. Specifically, a theoretical gap appears to exist between the expressed demands of investors for more information and the intended purpose underlying the preparation of external financial statements.

The summary of the literature with respect to the issues involved and the purpose of accounting information is brief, but specific, and any further comments from other sources would be mostly redundant. The section on objections to providing segmented data implicitly suggests management's inability to resolve the issues on a theoretical basis.

RELEVANT ISSUES CONCERNING CONGLOMERATE REPORTING

Definition of Conglomerates

It is extremely difficult to specify succinctly what constitutes a conglomerate enterprise. Each author who writes or comments about the

term seems to place a different emphasis on what he feels is the most salient feature. Among the varied array of opinions are the following characteristics suggested by the AICPA: conglomerates operate in divergent industries, on a highly decentralized basis, have few common production or marketing facilities, and have limited joint costs.[1]

Similar characteristics were expressed by witnesses appearing before the 1966 United States Senate Sub-committee hearings. Dr. Willard F. Mueller stated that conglomerate enterprises:

> 1. ... are much larger, in the absolute sense, than their competitors.
>
> 2. operate across a large number of separate economic markets.
>
> 3. occupy much larger market positions in some markets than in others.
>
> 4. meet one another with increasing frequency in their respective markets.[2]

Appearing before the same committee, Mr. Yura Arkus-Dunton, Investment Officer of the Dreyfus Fund, described a conglomerate company as one "which operates across a considerable number of markets."[3] In contrast, Mr. Manuel Cohen of the Securities and Exchange Commission asserted that conglomerates featured "those companies engaged in multiple

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[1] A letter by the AICPA Committee on Relations with Securities and Exchange Commission and Stock Exchanges to Clifford V. Heimbucher, September 2, 1966, quoted by A.A. Sommer, Jr., "Conglomerate Disclosure: Friend or Foe?", The Business Lawyer (January, 1967), p. 325.

[2] Statement of Dr. Willard F. Mueller before the Sub-committee on Antitrust and Monopoly, Committee on the Judiciary, United States Senate, 1966, p. 1865, quoted by A.A. Sommer, Jr., *ibid.*, p. 326.

[3] Statement of Mr. Yura Arkus-Dunton before the Sub-committee on Antitrust and Monopoly, Committee on the Judiciary, United States Senate, 1966, p. 1705, quoted by R.K. Mautz, "Identification of the Conglomerate Company," Financial Executive (July, 1967), p. 20.

and distinct lines of business."[4]

Although these definitions are limited to subjective opinions, one unique characteristic of a conglomerate enterprise is diversification. This was defined by Leopold Schachner "as an act or policy of entering a new basic area of specialization with reference to both production and markets."[5] He emphasized that, although a diversified company will tend to be a divisionalized company, the latter need not necessarily be a diversified company. Thus, a conglomerate connotes much diversity, vast size, and extreme unrelatedness.[6]

The Reporting Problem of Diversified Companies

Accountants have long been aware of the criticism directed at how financial information is communicated. Concomitant with this dissentive attitude on the part of external users of financial information has been the emergence in recent years of an increasing number of diversified companies. Since a diversified firm is engaged in several different economic activities, the reported operations of a single diversified unit is often buried in the overall operations of the company. Investors are thus apprehensive about the loss of corporate identification which ensues from this type of procedure. One particular author nicely summarizes why this type of reporting practice has promulgated adverse opinions from investors. According to Mautz, an

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[4] Statement of Mr. Manuel Cohen before the Sub-committee on Antitrust and Monopoly, Committee on the Judiciary, United States Senate, 1966, p. 1981, quoted by R.K. Mautz, ibid., p. 21.

[5] Leopold Schachner, "Corporate Diversification and Financial Reporting," The Journal of Accountancy (April, 1967), p. 46.

[6] Ibid., p. 44.

investment decision is concerned with profitability, risk, and with potential for growth.[7] Thus, the investor requires data about a company that will allow him to evaluate and analyze these variables in an effort to make intelligent investment decisions. How the investor may arrive at these decisions, and the techniques available to him are discussed in Chapter IV.

The important point, though, is that financial statements are one medium of communicating information necessary for external investment decisions. Traditionally, investors have relied heavily on the income statement and its related components as well as on balance sheet items. For financial reports representing the operations of a single economic activity, a uniform rate exists within the domain of the company for the three variables - profitability, risk, and growth potential. However, the same premise does not hold for conglomerate companies. As Mautz notes:

> ... identifiable segments or components of conglomerates are sufficiently diverse to experience rates of profitability, risks, and opportunities for growth, independently of other segments or components of the company.[8]

Needs of Investors

The claim for more information from diversified companies by investors has been manifested in many journals, texts, and other publications. William H. Moore, writing in 1945, suggested that managements take pride in stating their corporation's diversity, but diversification

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[7] R.K. Mautz, op. cit., p. 23.

[8] Ibid., p. 24.

is discussed only in textual and qualitative, not quantitative, form. He asserted that:

> Stockholders should know if any substantial portion of their company's invested capital is losing its value as an income producer .... If investment is to flow under the capitalistic system to its most efficient and best use investors must have more data from diversified firms.[9]

Perhaps the most comprehensive sources conveying the needs and demands by investors emanate from three empirical research studies conducted in the 1960's. The earliest was a study by Cerf[10] of the corporate reports of 527 companies including information gathered from 215 security analysts. His study indicated that investors were strongly desirous of more information, particularly breakdowns of sales and income by sources.

In response to pressures from the Securities and Exchange Commission and opinions in the financial community for more disclosure of segmented operations, the Accounting Principles Board stated that: "The Board recognizes that such information may be useful for investors in appraising past performance and future risks and prospects of diversified companies."[11] Just prior to their pronouncement, the Financial Executives Research Foundation initiated a research project on financial

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[9] William H. Moore, "Accounting for Sources of Income," The Journal of Accountancy (April, 1945), pp. 288-290.

[10] Allan R. Cerf, Corporate Reporting and Investment Decisions, (Berkeley, California: Public Accounting Research Program, Institute of Business and Economic Research, University of California, 1961).

[11] A statement issued by the Accounting Principles Board of the American Institute of Certified Public Accountants, "Disclosure of Supplemental Financial Information by Diversified Companies," The Journal of Accountancy, (October, 1967), p. 52.

reporting by diversified companies under the direction of R.K. Mautz.[12] Included in the study was an "Investors Questionnaire" answered by 218 financial analysts and investment advisors. The questionnaire indicated that the most important investment objective was maximizing return in the long run from a combination of dividends and capital appreciation. It also indicated that the most important company characteristics influencing these objectives are the growth potential for earnings, past trends of profits, and risk.[13]

Finally, a publication was released in 1968 by Morton Backer and Walter B. McFarland, Research Director for the National Association of Accountants.[14] This document summarized the findings of 72 carefully selected financial analysts interviewed to determine what financial information from segmented company reports is desired in making investment decisions. The uses which were specified for segmented operating results in making security investment decisions are outlined below:

1. Segmented reports are wanted to provide knowledge of what business a company is in and the relative size of the several components.
2. Sales and contributions to enterprise profit are wanted in forecasting consolidated profits.
3. Appraisal of the success which management of a company has had in making acquisitions.[15]

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[12] R.K. Mautz, Financial Reporting by Diversified Companies (New York: Financial Executives Research Foundation, 1968).

[13] Ibid., p. 151.

[14] M. Backer and W.B. McFarland, External Reporting for Segments of a Business (New York: National Association of Accountants, 1968).

[15] Ibid., pp. 6-10.

The reasons behind these demands, respectively, were that price-earnings multiples are affected by risk; the overriding objective of the investor is to forecast income; and analysts are interested in management's success.

Objections to Providing Segmented Data

The objections against providing more detailed disclosure of the financial activities of conglomerate companies are multiple and varied. Many dissentive comments stem primarily from corporation executives and are based on purely subjective opinions.[16] For example, one of the main arguments stressed in the literature is that such information would give competitors secret information and therefore unfair advantages. Cerf's study and witnesses before the recent United States Senate Sub-committee hearings all indicated that most of the fears on this account have been over-emphasized and are unwarranted.

Certainly there are individual cases which have been cited in the literature, where additional information may have assisted the investor in his decision-making capacity. But, as one author notes, the argument against providing segmented data generally is that the investor is investing in the enterprise as a whole, not in the particular segments as such.[17] Since an investor relies heavily on predic-

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[16] Letters to the Editor, Financial Executive (June, 1966), pp. 4, 6, 8 and (July, 1966), p. 4, quoted in "Letters Discussing Product Line Reporting," in Financial Accounting Theory II, ed. Thomas F. Keller and Stephen A. Zeff (New York: McGraw-Hill Book Co., Inc., 1969), pp. 226-233.

[17] A.A. Sommer, Jr., "Conglomerate Disclosure: Friend or Foe?," in Financial Accounting Theory II, ed. Thomas F. Keller and Stephen A. Zeff (New York: McGraw-Hill Book Co., Inc., 1969), p. 218.

tions and estimates concerning all the activities of a conglomerate such an argument would appear to be untenable.

Finally, some academicians and management experts alike have expressed reluctance to the idea of providing segmented data for a conglomerate's financial activities based on implicit conceptual difficulties. Keith Goodrich summarizes the more important reasons contributing to this pessimism:

1. Definitions of products and profits are not clear.
2. Allocated costs are difficult to handle.
3. Joint and common costs are impossible to allocate.
4. Disclosure of sales may violate government contracts.
5. Disclosure would not be useful; on the contrary, it would be "downright misleading".[18]

RELATIONSHIP OF ACCOUNTING AND FINANCIAL INFORMATION

The conventional means of communicating financial data are the annual financial statements of a company. Usually, these statements are prepared and presented according to generally accepted accounting principles. However, there are two fundamental premises underlying this procedure which are often overlooked amidst other considerations. The first is that accounting data should be evaluated in terms of its purposes. Second, decision-making should be the primary requisite in providing this information. Although both of these premises are normative, they provide the framework for subsequent analysis.

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[18] Keith Goodrich, "Executive's View of Corporate Reporting Responsibilities," Financial Executive (December, 1966), p. 20.

The idea that accounting data ought to be evaluated in terms of its purposes is one of the earliest and most prevalent thoughts in accounting.[19] In 1922, W.A. Paton asserted that "accounting is a highly purposive field and any assumption, principle, or procedure is accordingly justified if it adequately serves the end in view."[20] A similar and contemporary viewpoint, relating to the purpose of accounting data, was expressed by authors of the American Accounting Association's A Statement of Basic Accounting Theory: "the all-inclusive criterion is the usefulness of the information."[21]

The relationship between useful data and decision-making generally has received paramount attention in the literature. George O. May, commenting on the statement issued in June, 1941, by the American Accounting Association, stated that the A.A.A.'s basic assumption was that: "the purpose of periodic financial statements of a corporation is to furnish information that is necessary for the formulation of dependable judgments."[22] This conclusion was stressed as well by Paton who noted that:

> The purpose of accounting may be said to be that of compiling and interpreting the financial data ... to

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[19] William H. Beaver, John W. Kennelly, and William M. Voss, "Predictive Ability as a Criterion for the Evaluation of Accounting Data," The Accounting Review (October, 1968), p. 678.

[20] W.A. Paton, Accounting Theory (New York: The Ronald Press, 1922), p. 472.

[21] American Accounting Association, A Statement of Basic Accounting Theory (New York: American Accounting Association, 1966), p. 3.

[22] George O. May, Financial Accounting (New York: The Macmillan Company, 1957), p. 12.

> provide a sound guide to action by management, investor, and other interested parties.[23]

Also, the American Accounting Association in 1966 commented:

> The committee defines accounting as the process of identifying, measuring, and communicating economic information to permit informed judgments and decisions by users of the information.[24]

THE VALUE OF ADDITIONAL INFORMATION IN INVESTOR DECISION-MAKING

The author finds the claims expressed by investors for segmented financial data void of any theoretical substance. Copious amounts of detail have been extracted from investor questionnaires and a great deal of emphasis in the literature has been directed at the diversified nature of conglomerates. Based on these premises, investors imply that they have provided convincing evidence to support their demands. This is not to imply that no additional information may be intrinsically warranted; rather, the onus is on the investors to demonstrate that additional information is of value.

An attempt to determine of what value additional information can be to investor decision-making is an arduous task. A starting point, though, rests in some specification of investor decision-making behavior. Certainly one cannot expect an in-depth analysis of investor thought processes; such an endeavour is simply beyond the current state of knowledge. However, an analysis of the models and theories which do

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[23] W.A. Paton, Essentials of Accounting (New York: The Macmillan Company, 1949), p. 2.

[24] American Accounting Association, op. cit., p. 1.

exist can provide some of the key variables related to the decision-making process.

One variable of critical importance to this discussion concerns the objectives of investors. If these can be defined in terms of a decision model, then the criteria relevant to the actual decisions may be isolated. At this point the relationship between decision criteria and information becomes evident. If information enhances the investor's ability to predict or evaluate the decision criteria, then such information can be assumed to be useful. The only test of usefulness as defined here is if the information allows the investor to move in the direction of satisfying his objectives. However, this statement must be qualified in that, in the normative sense, the information may be useful but may in fact be used erroneously.

There is one important contingency to the above discussion concerning the decision criteria of investors. If the phenomena affecting the behavior of the decision criteria are completely indeterminate, then providing the investor with any additional information is a wasted effort. For example, assume that the decision criteria are the expected future price of securities. If the behavior of future prices cannot be predicted, or expressed another way, the movement of stock prices is random, the value of additional information is seriously challenged. It should be noted that predictability in itself is an "end" and not a "means to an end". Thus, expectations concerning the behavior of future prices may very well be the more relevant focus of attention. If this is the case, then the purpose of information is to enable investors to compare their expectations with "objective" accounting data.

A final issue remains in determining the value of information

even if the above assumptions prove to be valid. Investors attempt to use financial data to facilitate their decision-making capacity. But this data emanate from the financial statements of companies which are actually surrogates representing the intrinsic economic position of the firm. A safe assumption is that this intrinsic value of the company, or "real" value to use the economic term, is highly correlated with the future price of that firm's stock. Therefore, the method of measuring the intrinsic value of a company is vital to the decision-making activity of the investor.

SUMMARY

The entire conglomerate reporting controversy is immersed in complexity both at the pragmatic and theoretical level. Major emphasis in the literature, however, is on the pragmatic aspects of the problem which alone encompasses enormous difficulties.

There is no conclusive definition of a conglomerate enterprise. The only consensus is that a conglomerate is large and diversified in its economic activity. Because of these two attributes, investors have expressed concern over the inadequacy of information they receive in the financial statements of diversified companies. The investors's main contention is that the total entity basis of reporting for conglomerates obscures information relating to the investment variables of profitability, risk, and growth potential. As a possible solution to alleviating this difficulty, investors indicate that they strongly desire segmented data in the financial statements of conglomerate companies.

Negative opinions regarding the issue of additional disclosure prompt a closer investigation of the matter. Understandably, the

relationship between accounting and financial information comes into focus. The purpose of accounting is to provide information in the financial statements which facilitates decision-making and is therefore useful. Unfortunately, the complexity of these concepts in relation to the demand by investors for segmented reports is almost completely neglected in the literature.

In sum, the conglomerate controversy cannot be properly evaluated by merely considering the conceptually unsupported demands of investors for more information. A more profound insight into the possible value of segmented data in conglomerate reporting is required. This necessitates an examination of investor decision theory to determine what financial information best serves the needs of investors. Equally important is the need to assess which measurement criteria is most relevant in communicating this financial data to investors.

CHAPTER III

THE FUNDAMENTALS OF DECISION THEORY

The previous chapter stressed the theoretical deficiencies which appear to exist between the criticisms of investors for segmented financial statement data and the intended purpose of accounting information. Usefulness was stressed as being central to the purpose of accounting information but only in the context of facilitating decision-making. But the question must be asked, what does it mean to facilitate decision-making? One approach to resolving this question, at least partially, is to describe the major distinctive features of decision theory.

Decision theory is important in discussing the conglomerate disclosure controversy for several reasons. Decisions are concerned with information and knowledge. Investors require information for assessing buy and sell decisions in the stock market. Essentially, these decisions involve a choice from among securities which represent different profit opportunities. Evaluating these opportunities requires that the investor estimate the future trends of stock prices and dividend yields. Financial statements are one important source of obtaining information for establishing these estimates.

Decision theory also stresses the significance of relevant and timely information. In fact, the idea of relevant information is only meaningful if it fulfills certain conditions. Decision theory outlines these conditions and provides the framework for analyzing relevant information in the light of investor needs and financial

information. Finally, decision theory identifies the variables pertinent to any specific investor decision model.

Thus, a discussion of decision theory seems to be warranted. Not only can it present some insight into the above issues, but it will also reveal the complexity behind the investor's demands for more disclosure in conglomerate financial reports.

It is possible to distinguish two main lines of development in decision theory. One pertains to closed system models and is often associated with the economic or classical concept of rational decision behavior. The second line of thought relates to an open system framework for describing decision activity and is based on behavioral foundations. Certain dimensions of these models are not mutually unique, however, as the discussion which follows exemplifies. The purpose of this chapter then is threefold: (1) to describe the basic elements of decision theory; (2) to establish the role of information in decision-making; and (3) to relate this discussion to financial statements.

ECONOMIC THEORY OF DECISION-MAKING

Characteristics of the Classical Decision Model

The principal feature of the classical economic theory of rational economic man is that the decision-making process occurs in a specific and clearly defined environment. In this model goal attainment is achieved through optimal choice activity. Stated differently, the economic theory of the firm holds that goals are pursued by employing the maximizing decision rule.[1]

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[1] Fritz Machlup, "Theories of the Firm: Marginalist, Behavioral, Managerial," The American Economic Review (March, 1967), pp. 1-30.

Implicit in this model is the idea that search behavior has uncovered all of the relevant aspects of the total environment. As a result, perfect information exists regarding the problem situation from which a complete range of alternatives emerge. This reasoning is based on the fact that the alternatives are "given" in the model but the theory does not indicate how or why the range of alternatives is selected.

Concomitant with the assumption of a complete set of alternatives for any decision is the assumption that the corresponding consequences associated with each of the presumed alternatives are known. From these consequences, there is the additional assumption that the payoffs, i.e. complete utility ordering, which would ensue from any chosen alternative can be determined.[2] Of course the magnitude of any particular payoff is dependent on the state of nature which in turn is a function of the environment.

The state of nature in the classical economic model may involve certainty, some degree of risk, or genuine uncertainty. An integral aspect of these three states of nature involves considerations of longrun versus shortrun decisions.[3] Investors in the stock market are confronted with this dichotomy of longrun versus shortrun decision-making. They may strive for quick returns in the shortrun by way of capital gains. Alternatively, investors may seek a stabilized flow of income over a longer period by concentrating on prospective dividends.

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[2] James G. March and Herbert A. Simon, Organizations (New York: John Wiley & Sons, Inc., 1965), p. 138.

[3] Herbert A. Simon, Administrative Behavior (New York: The Free Press, 1969), pp. 65-66.

Investors analyze financial statements for information which may indicate the nature, magnitude, and chances for success, of both capital gains and dividends. Regardless of the time interval involved, the classical economic model assumes that the payoffs relevant to a given alternative have been discounted to reflect the state of nature facing the decision maker.

Classical economic theory next assumes that some utility index exists by which the decision maker can rank the consequences emanating from each alternative. The final phase of this process simply involves a choice which maximizes the returns to the decision maker. For the rational economic man this constitutes selecting the alternative with the highest payoff.

Some Difficulties in the Economic Model

There are several assumptions in the economic or classical model which are not consistent with the "realities" of decision-making. The model specifically assumes that all the alternatives to the decision problem are given, that the consequences attached to each of the alternatives are known, and that the resultant payoffs can be precisely determined. These conditions demand that perfect knowledge exists - a further assumption of classical economic theory. In the first place, it is not feasible to generate all the alternatives pertinent to a problem situation. To do so would require perfect knoweldge concerning all the intricacies of the environment. The decision maker has neither the capacity nor the resources at his disposal to obtain such information. In fact, the decision maker is probably not even aware that

various alternatives, apart from the ones his search activity discloses, even exist.[4]

Since there is a lack of perfect information, determinism cannot be assumed in the outcomes associated with each of the limited set of alternatives. Therefore, the case of pure certainty can be challenged in such a hostile environment. Finally, the probabilities associated with the cases of risk and genuine uncertainty, that is, the utility ordering for each alternative and consequence, are not objectively known. At best, the probability estimates of the state of nature are an approximation of the "true" environment. In sum, the decision maker can only react to a limited range of alternatives bounded by indeterminate consequences.

As a result of imperfect information then, any anticipated payoff is also an approximation of the true event. Therefore the decision maker in choosing an alternative does not "maximize" but optimizes *vis-à-vis* the limited knowledge available to him. To advance one step further, an understanding of the cause/effect chain in decision-making is beyond the limited state of knowledge available to the decision maker. According to C.W. Churchman, this means that all decision-making activity involves suboptimization.[5] Suboptimization simply means that the goals pursued by the decision maker are in conflict because the attainment of one goal requires the decision

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[4] *Ibid.*, p. 67.

[5] C. West Churchman, *Challenge to Reason* (New York: McGraw-Hill Book Company, Inc., 1968), especially Chapter 1.

maker to sacrifice another goal simultaneously. Investors continually face this problem in trading off higher risk for greater expected returns. Again, financial information is relied upon by investors to reduce the uncertainties of the trade-off problem. Thus, optimization is not possible in reality because the decision maker does not know if he has all the relevant variables bearing on the decision situation.

One last difficulty remains with the closed system or economic model of rational man. It assumes that the decision maker has a specified value system such that he is able to order systematically all the alternatives. The traditional approach to this problem incorporates utility theory which applies a cardinal ranking to the preferred alternatives. However, the validity of utility theory is sometimes questioned in the literature. One notable author suggests that unless some commodity can be taken as equivalent to utility, the measurement of utilities, or even the proof of their existence, is a most difficult matter.[6]

ELEMENTS COMMON TO DECISION THEORY

To understand some of the important implications of the behavioral theory of decision-making in contrast to the classical economic theory of decision-making, it is necessary to have a grasp of certain concepts. Accordingly, this section of the chapter discusses the following elements: state of nature; goals; alternatives; preferences; choice; and rationality. In so doing, the paramount

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[6] C. West Churchman, Prediction and Optimal Decisions (Englewood Cliffs, New Jersey: Prentice-Hall Co., Inc., 1961), Chapter 8.

importance of information is exemplified.

State of Nature

Decisions do not occur in a vacuum. They are subject to the actions of individuals that in turn are bound by certain constraints and contingencies. Of particular importance in this regard are those aspects of the environment which pervade every decision process. The environment is relevant for two primary reasons. First, a decision involves a choice from among alternatives; and second, some payoff or outcome is associated with each alternative. The critical issue here is that both the alternatives and the corresponding consequences depend upon the state of nature. There are three ways of characterizing the state of nature:

1. Certainty: theories that assume the decision maker has complete and accurate knowledge of the consequences that will follow on each alternative.

2. Risk: theories that assume accurate knowledge of a probability distribution of the consequences of each alternative.

3. Uncertainty: theories that assume that the consequences of each alternative belong to some subset of all possible consequences, but that the decision maker cannot assign definite probabilities to the occurrence of particular consequences.[7]

The pure case of certainty simply does not exist in the real world of decision-making. It assumes that perfect knowledge exists regarding all the possible alternatives and consequences facing the decision maker. A complete dichotomy prevails in the case of absolute uncertainty. Knowledge about possible alternatives and consequences

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[7] James G. March and Herbert A. Simon, Organizations (New York: John Wiley & Sons, Inc., 1965), p. 137.

is too imperfect to permit meaningful calculation.[8] Finally, risk assumes that a state of nature exists that can be stated in either an objective or subjective probabilistic frame of reference. Stated in such a manner, risk implies that the consequences of certain actions can be determined based on probability estimates but only within some degree of error.

Since it is not possible to make perfect forecasts of the future events, probability estimates are basically of two kinds, namely, objective and subjective. The assignment of objective probabilities to possible outcomes in the environment is based on definitive historical information, common experience, or rigorous _a priori_ analysis. Usually, however, this type of objective evidence is not available and subjective probabilities are incorporated based on the motivational nature of the decision maker. The motivational nature of the decision maker is influenced by such factors as:

1. Degrees of belief in the relative frequency basis of objective probability.
2. Perceptions of objective probability.
3. Evaluation of the importance of the situation.
4. Revocability of the decision.[9]

Because of these factors, then, there is in all likelihood a discrepancy between objective and subjective probability estimates that must be

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[8] H. Bierman, Jr., C.P. Bonini, L.E. Fouraker and R.K. Jaedicke, _Qualitative Analysis for Business Decisions_ (Homewood, Illinois: Richard D. Irwin, Inc., 1965), Chapter IV.

[9] Marcus Alexis and Charles Z. Wilson (eds.), _Organizational Decision Making_ (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 154.

recognized in discussing decision behavior. For investors, the more relevant and reliable that the information is in financial reports the less this discrepancy is likely to be.

Goals

Parsons defines a goal as an image of some future state which an individual is attempting to bring about.[10] For individuals, the idea of attaining some future state serves two purposes. First, it implies some degree of ordered activity which is necessary in achieving future objectives or ends. Second, the desire to attain some future state establishes the decision criteria necessary for ordered behavior to be meaningful.

Whatever the level of abstraction associated with individual goals, however, they must be made operational because, otherwise, efficient allocation and organized behavior will not ensue. Through a process of successive factorization and sequential attention to objectives, abstract goals are reduced to a more concrete form. As March and Simon state:

> The general goal must be split up into major subgoals before consideration can be given to goals at a lower level. Hence, the mode of subdivision has an influence on the extent to which planning can proceed simultaneously on the several aspects of the problem. The more detailed the factorization of the problem, the more simultaneous activity is possible, hence, the greater the speed of problem-solving.[11]

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[10] T. Parsons, The Structure of Social Action (New York: McGraw-Hill Book Company, Inc., 1937), p. 44.

[11] James G. March and Herbert A. Simon, op. cit., p. 193.

As an example, an investor wishing to maximize his wealth may redefine such a primary goal to one of obtaining the greatest benefits from investing in bonds, or common stocks, or some other type of security.

Alternatives, Preferences, and Choice

In every decision setting there is at least one alternative available. In some cases, the single preference may be to do nothing - the null determinant - although usually a wider range of alternatives is open to the decision maker. Once the alternatives have been selected or determined there still remains a problem for the decision maker. Associated with each alternative there is some relationship to the state of nature which determines a payoff.[12] The crucial issue here is that a preference ordering of payoffs, and thus alternatives, is a function of the individual's value system which is based on his motivational nature.

Once the alternatives are arrayed for the decision maker a choice is then available based on some decision rule. For the present it is sufficient to state that the decision maker selects that alternative which leads to the preferred set of consequences.

Rationality

The process of decision-making is a response to a problem situation. There are innumerable reasons as to why a problem may arise and thus invoke activity. Goal attainment may be thwarted by

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[12] For a comprehensive analysis of this relationship, see Robert Schlaifer, Probability and Statistics for Business Decisions (New York: McGraw-Hill Book Co., Inc., 1959).

impending future events, or there may be a discrepancy between performance and the aspiration level of the decision maker, or some situation simply keeps recurring and must be resolved.[13] Regardless of the reason, the decision maker is intuitively aware that some action must be taken to resolve the problem. A first step is to seek additional information. By engaging in such activity, alternatives are generated from which a choice ultimately ensues.

The action of choice alone, however, does not necessarily constitute rational behavior. As Blau and Scott indicate "... decisions are rational when individuals select the best alternative for reaching a goal."[14] This definition is somewhat limited in scope. A more comprehensive definition is advanced by Cyert and March.[15] They describe rational behavior as that action which is orientated towards the selection of an alternative through standardized search procedures so as to maximize returns to the individual in accordance with some preference ordering of future outcomes.

In sum, rationality together with the other elements described above, implies a different decision setting from the economic model. In a dynamic, often hostile environment with imperfect knowledge, the

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[13] Herbert A. Simon, The Shape of Automation for Men and Management (New York: Harper & Row, Inc., 1965), pp. 61-76.

[14] Peter M. Blau and W. Richard Scott, Formal Organizations: A Comparative Approach (San Francisco: Chandler Publishing Company, 1962), p. 36.

[15] Richard M. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs, New Jersey: Prentice-Hall Co., Inc., 1963), p. 27.

maximization rule in decision-making cannot be accepted. Under such conditions, the role of information takes on new dimensions. This becomes apparent in describing the behavioral theory of decision-making.

BEHAVIORAL THEORY OF DECISION-MAKING

A behavioral model of decision-making runs parallel to the thoughts expressed in open systems theory. Contrary to the classical or closed system decision models, the open systems model is not deterministic. As the name suggests, the model is open to the environment and therefore interaction between the system and the environment is of the essence. That is to say, the open systems model takes explicit cognizance of the environment in the external dynamics of the decision setting. Since the system is open it does not experience stability *per se*; rather it is continually moving toward a state of dynamic equilibrium. As a result, the system is constantly adjusting its input-conversion-output process.[16]

Information serves a key role in such a system. It basically provides a feedback function by which performance can be evaluated. Financial statements serve a similar purpose for investors. As new reports become available on a firm's operations, investors compare their expectations with previous buy-sell decisions and formulate new courses

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[16] For a complete discussion of open systems theory from a psychological and sociological viewpoint as it applies to organization, see Daniel Katz and Robert L. Kahn, *The Social Psychology of Organizations* (New York: John Wiley & Sons, Inc., 1966), especially Chapters 1 & 2, and J.D. Thompson, *Organizations in Action* (New York: McGraw-Hill Book Co., Inc., 1967).

of action. Instrumental in this process, however, is the investor's particular value system and cognitive processes.

Basic Elements of the Behavioral Model

Cognition is one of the fundamental qualities of the human system. The essence of human cognition is the faculty to possess knowledge. As Descartes clearly saw, "*cogito, ergo sum*;" thus man not only knows, but knows that he knows.[17] Because of this capacity, an individual is deeply influenced by his perception of the environment around him. He responds to stimuli in the environment through a variety of patterned behaviors which in turn influence the manner in which he might behave in the future.[18]

Together with human cognition, the human system possesses a value system based on relationships, experience, emotions, and other associations with the environment. Actually these are equivalent to the stimuli in the stimulus-response-output theory of Sigmund Freud in psychology. An in-depth analysis of the subject is beyond the scope of this discussion, but such human attributes play an important role in describing the individual's decision-making process.

The Decision Process

To pretend to understand the causal relationship in the cognitive process of decision-making would be extremely naive. However,

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[17] Kenneth E. Boulding, *The Image* (Ann Arbor: University of Michigan Press, 1956), quoted by Marcus Alexis and Charles L. Wilson, *op. cit.*, p. 158.

[18] Herbert A. Simon, "Theories of Decision-Making in Economics and Behavioral Science," *The American Economic Review* (June, 1959), pp. 272-278.

certain aspects of behavioral activity can be described at a somewhat elementary level.

Initially, an individual can be considered to be in a problem situation. Moreover, he has a certain aspiration level which is manifested in his desire to reach a certain goal. In a sense, the individual's aspiration level displaces the primary goal as conceived in the classical model of decision-making. Furthermore, the fact that the individual is in a problem situation implies that his aspirations are below the desired level which in turn necessitates action.

The action which the individual takes is limited to search behavior based on two conditions: (1) cognitive limitations of rationality; and (2) search scanning based on the individual's degree of dissatisfaction. The former simply recognizes that the individual cannot accumulate all the alternatives and consequences. He is not only restricted by a limited perspective of the environment but also by his mental ability to comprehend the magnitude of all the possible combinations of alternatives and payoffs. Should one of these alternatives satisfy the individual's aspirations then the choice is determined. In contrast to the classical model, the payoff is thus based on the principle of "satisficing".

The search scanning activity of the individual, based on the degree of dissatisfaction, invokes different types of behavior. If there is only a marginal difference between the individual's aspiration level and his current state of dissatisfaction, an "incremental" approach to obtaining alternatives will probably ensue. Under such circumstances, very few alternatives need to be evaluated before the individual makes

a choice and satisfies his position. However, when the individual perceives his dissatisfaction to be very great, a "systemic" approach is most likely to occur. This involves search activity several magnitudes greater than that of the incremental approach. But regardless of the approach adopted, search activity continues until the individual discovers a satisficing payoff.

What this discussion really emphasizes then is the process of the decision maker adapting various goals as his aspiration level changes. Cyert and March illustrate mathematically the functional relationship of goals in successive time periods.[19] They assume a linear function,

$$G_{t+1} = a_1 G_t + a_2 E_t + a_3 C_t$$

where G is the decision maker's goal, E the experience of the decision maker, C a summary of the experience of comparable decision makers, and where $a_1 + a_2 + a_3 = 1$. a_3 reflects the decision maker's sensitivity to the performance of other decision makers while a_1 and a_2 reflect the speed at which the decision maker revises goals in the face of experience. The information conveyed in financial statements and used by investors, is analogous to this process. All investors in the stock market form part of their decisions on knowledge gained from successive interperiod financial reports. Each investor also relies on the behavior of other investors which is manifested in stock market price movements. Of course the behavior of other investors also has part of its origin in how information is interpreted from financial reports.

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[19] Richard M. Cyert & James G. March, _op_. _cit_., p. 123.

One important feature of this entire process is the flexibility of the constraints facing the individual. There are no "given" alternatives or consequences. Instead, the range of alternatives and the individual's aspiration level are variable. Furthermore, the relationship between these two factors tends to be inverse. That is, should the individual's choice result in a payoff less than his aspiration level, then the range of alternatives is increased in subsequent search activity. At the same time the individual's level of aspiration is reduced. On the other hand, should the outcome exceed the individual's level of aspiration, then this new level of aspiration is desired and the range of alternatives is decreased simultaneously.[20]

In sum, the behavioral model of decision-making differs considerably from the economic model. Attention is primarily focused on human cognition, value systems, and the principle of "satisficing behavior" rather than "maximizing behavior".

SUMMARY

The problem of this thesis concerns the demands by investors for segmented financial reports in light of the intended purpose of accounting to provide information that facilitates decision-making. Decision theory is a convenient starting place for evaluating the significance of these demands and the complexity of the issues involved. It helps to discard the inference that breaking down the figures prepared

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[20] *Ibid.*, p. 123.

under the total entity concept of reporting is not void of more complex considerations. This is accomplished by focusing on the nature of decision-making and the vital role of information.

The principal theories of decision-making are rooted in the classical economic theory of rational man and the behavioral theory of rational choice. The classical economic model of decision-making assumes that a closed system exists in which there is perfect knowledge regarding all of the decision variables. Alternatives, consequences, and outcomes are all "given" parameters and the only remaining problem for the decision maker is to apply the maximization rule.

A closer look at the states of nature, goals of decision makers, the means-end relationship, and the concept of rationality, casts some doubt on the premises underlying the classical economic model of decision-making. In particular, the behavioral theory of decision-making meets the challenge by examining decision activity in a manner that closely parallels open systems theory. The behavioral theory is clearly cognizant of the interaction and interdependency between the decision framework and environmental forces. Knowledge is assumed to be imperfect thus drastically limiting the search and choice activity. Moreover, the decision rule involves suboptimization as opposed to the maximizing principle stressed by classical economic theory.

Investors in the stock market operate within a specific decision setting. Nonetheless, their mode of behavior encompasses many of the aspects described in decision theory. Specifically,

rational investors adopt certain goals, search for alternatives, and attempt to evaluate related consequences and payoffs. Above all, investors as decision makers require information relative to their decision needs.

Information is vital to decision behavior. With the decision maker's limited human capacity for knowledge and his fallible sensory perceptions, the quantity of information, and its content is a salient variable in the decision process. Forces are continually operating in an individual's milieu which change his goals or his perceived aspirations. In this respect information is important for two reasons. First, a decision emerges from the assessment of information received, in the light of the decision maker's other observations, his expectations, and his values at the time. Second, the principle of feedback, *vis-à-vis* new information, allows the decision maker to reevaluate past decisions and take corrective action if it is warranted.[21]

Information has other implications in the decision process. One dimension of importance is the time factor. If information is "late" relative to the problem situation, then it is reduced to the category of irrelevant data. The other aspect of untimely information is availability. That is, a decision maker may become informed about certain events but only too infrequently. This is often the situation

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[21] R.J. Chambers, "The Role of Information Systems in Decision Making" in *Financial Information Systems*, edited by J.B. Bower and W.R. Welke (Boston: Houghton Mifflin Company, 1968), p. 51.

facing investors who rely heavily on economic information issued by government bureaux. A second dimension concerns the cost of obtaining information. Clearly, if the cost of obtaining information is greater than the gains accruing to the decision maker, such decision activity is undesirable. Thus, information exhibits what is called the phenomena of declining marginal value.

Many characteristics are ascribed to the term information. Among the more common are that information must be relevant, valid, accurate, clear, and reliable, for decision-making purposes. However, these features do not connote value which is the all important criteria relative to decision-making. Emery submits that information has value only if:

1. Expected posterior probability estimates differ from prior estimates (that is, the information has some "surprise" content).
2. Decisions are sensitive to the availability of additional information.
3. The payoff is sensitive to differences in decisions.[22]

These conditions are central to decision theory. They also afford insight into the significance of information emanating from financial statements. This will become more apparent in the later chapters of this thesis.

Lastly, there exists a high degree of similarity between specific investor decision models and the general theories of decision-making. More important, though, is the need to examine investor

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[22] James C. Emery, Organizational Planning and Control Systems (London, Ontario: The Macmillan Company, 1969), p. 91.

decision models in an effort to assess further the implications of information on investor decision-making.

In summary then, the discussion in this chapter stresses some of the key elements in decision theory and corresponding implications for the role of information in decision-making. The analysis is not meant to be exhaustive; it is representative, however, of the relevant issues in decision theory.

CHAPTER IV

INVESTOR DECISION MODELS

The preceding chapter enumerated but a few of the key elements in decision theory. The theme which dominated the chapter is quite clear. In a hostile environment, with imperfect knowledge, information is a crucial factor. Specifically, a firm's financial statements are a source of information, especially for investors. More important though, is that in a hostile environment financial statements have the potential to reduce the uncertainty facing the investor. The question which arises though is why financial statements possess this potential? An examination of investment decision theory provides some insight to this question.

Investment decision theory, commonly known as portfolio theory, is relevant to this thesis for a number of reasons. It first of all identifies the decision variables and the decision criteria which are unique to investor behavior. Unless these factors are known, the usefulness of information in accounting reports to investors cannot be evaluated. Also, portfolio theory provides a means for outlining the relationship between accounting information and the requirements of investor decision models. Thus, it is not sufficient merely to state that investors use financial statement data to estimate future stock prices. Finally, portfolio theory has implications for segmented reporting to investors.

The purpose of this chapter is to describe several models of portfolio theory. In addition, the discussion elaborates on the

aspect of investment decision theory for accounting information in external financial reports.

THE THEORY OF PORTFOLIO ANALYSIS

Basically, there are three separate stages to portfolio analysis theory. First, it is necessary to identify and quantify the parameters of the model. Given such parameters, the next step consists of determining the efficient set of portfolios. The final stage simply involves the problem of the investor choosing the portfolio he desires from among the efficient set generated in the second stage. This section discusses the inputs, analysis, and selection process with specific reference to the E-V model (expected return-variance) developed by Markowitz.[1]

Basic Elements in the E-V Model

It can safely be assumed that an investor purchases securities in anticipation of earning a return in the future. Naturally, the higher the return, the more satisfied the investor will be, at least in monetary terms.

The term "return" by itself is somewhat ambiguous and thus requires clarification. Generally, return can be considered in regard to two dimensions. One, of course, is the form, whether it be capital appreciation or dividends; the other is the specific time period involved before such returns are realized. For simplicity, it is

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[1] Harry Markowitz, Portfolio Selection, Cowles Foundation Monograph 16 (New York: John Wiley & Sons, Inc., 1959), p. 4.

sufficient to define return as the price differential of a security plus any dividends or interest over a one year period, all expressed as a ratio of the original price of the security.

Unfortunately, return is not the only factor influencing the investment decision. Equally as important is the uncertainty of the return expected from investment in securities. Thus, the fact that some doubt may exist as to the actual return, necessarily implies that the investor will be subject to some degree of uncertainty or risk.

Having established the elements above (return and risk) which influence the behavior of the investor, Markowitz proposed a general principle which is imperative to portfolio theory. The essence of this principle considers investors to be "risk averters" which means that they wish to maximize return and minimize risk. This is diametrically opposed to those investors whose behavior is irrational or speculative, such as bettors at a horse race who pay to take a chance. This type of investor is definitely excluded from this analysis.

Inputs of the Theory. No mention has been made thus far regarding how to quantify the two objectives of the investor. The criteria that Markowitz proposes evolves from the fact that return can be considered as a random variable in the future. Since this random variable can assume many values, some more likely than others, a probability distribution can be applied to all the possible outcomes. The best value for return is the "expected mean" of this probability distribution.

But judgment here is a critical factor because of the subjectivity involved and therefore some allowance for error is both desirable and necessary. To be sure, the investor would be much happier to know what the chances are of actually attaining this expected return. In other words, it is necessary to quantify the risk and one method of doing this is to simply estimate the variance of return from the expected mean. For example, one could estimate that the expected return on Security A is $100; however, there is a fifty percent chance of the return being as low as $90 and the same chance of it being as high as $110.

It should be noted that valid judgments are not created in a vacuum; invariably, they are a reflection of highly integrated and meaningful market data. It would be absurd to think that an individual investor could generate reliable estimates for all the securities available in the market. However, the security analyst can, and does, provide this type of information; moreover, he has access to information and statistical techniques which produce more reliable data than the investor could generate. But, as one writer warns, "statistical methods are fallible, neither pure judgment nor pure statistics can be heralded as 'the way' to arrive at values for expected return and variance."[2] Perhaps a combination of the two is the best approach.

The security analyst is able to provide one additional piece of information which is imperative in this theory and that is the

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[2] A.D. Martin, Jr., "Mathematical Programming of Portfolio Selections," Management Science (January, 1966), p. 157.

"interrelationships of the error ranges among securities."[3] More commonly known in statistics as covariance, Markowitz refers to this interrelationship, "as the second salient feature of security investment."[4] Its significance is related to the fact that the rates of return on securities tend to fluctuate upward and downward in unison. If this movement was perfectly correlated, diversification among securities would not alleviate any risk. In the true market situation, the correlation is high but not perfect. Markowitz suggests that because of this premise, the implication is that diversification can reduce risk but not eliminate it.[5]

The above concept of covariance can be explained in the observed behavior of some investors. They will try to select a combination of securities such that the reaction of one security will be uninfluenced by the movement of another security. Thus, the investor avoids placing all of his funds in the securities of one industry because there is usually a high correlation between earnings and dividends of companies in the same industry; instead, he diversifies his portfolio "across industries".

Analysis of the E-V Model. The discussion thus far has considered the nature of the inputs involved in portfolio selection and some of the rationale underlying the investor's objectives. The

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[3] Jerome B. Cohen and Edward D. Zinbarg, Investment Analysis and Portfolio Management (Richard D. Irwin, Inc., 1967), p. 760.

[4] Harry Markowitz, op. cit., p. 5.

[5] Ibid., p. 5.

logical question now is, how is an efficient set of securities selected from all the possible choices available to the investor? And when the efficient set is determined, what proportion of each security should be held by the investor?

Markowitz's model, albeit a theoretical one, is concerned with the efficient diversification of portfolios. It essentially consists of establishing the variables describing an investment portfolio which enter into the objective function of the portfolio holder. Typically, the variables are profitability and some proxy variable(s) for risk. Functional relationships are then developed between the values of profitability and risk for each security held in the portfolio in terms of the proportions of each security held. It is then possible to (a) delineate efficient portfolios such that no other portfolio is clearly preferable and (b) select the optimal portfolio from all efficient portfolios, given the individual portfolio holder's preference function.

The Fundamentals of Portfolio Programming. Suppose we assume that each investor is concerned with two variables describing his portfolio, the expected rate of return and the standard deviation of the probability distribution of the rate of return. What, then, is the relationship between the expected returns and standard deviation of returns for each individual stock considered and the expected returns and standard deviation of returns for the whole portfolio? Consider the following variables:

x_j - proportion of j^{th} stock held in portfolio

r_j - expected rate of return for j^{th} stock

6_j - covariance of returns of j^{th} stock

$6i_j$ - covariance of returns of j^{th} stock with returns of i^{th} stock

R - expected rate of return on whole portfolio

V - variance of returns on whole portfolio

It follows that the summation of x_j equals unity if there are n stocks under consideration. Also R equals summation of r_j weighted by x_j. To find V, however, requires that an n x m matrix for the x_j and $6i_j$ be established.

If the values of r_j and $6i_j$ are known then the efficient range of portfolios can be determined by selecting those non-negative values of x_j which maximize R for each value of V. Alternatively, given the individual's preference function in R and V and maximizing this with respect to all x_j determines the optimal portfolio without proceeding via the intermediate stage of determining the efficient set. In general, the preference function is not known and the objective of portfolio programming is then to present the individual with the efficient set from which to make his final selection.

Determining the Efficient Set of Portfolios

Legitimate Portfolios. The first step in determining the efficient set of portfolios is to identify the legitimate portfolios. This concept can best be illustrated through the use of geometry. Furthermore, by limiting the discussion to the three security-case, it is possible to show the legitimate set of portfolios in two-dimensional space.

In Figure 1, the proportion of the portfolio invested in Security One is shown on the vertical axis while the proportion of the portfolio invested in Security Two is shown on the horizontal axis.

Since the proportion of all three securities must equal unity, this can be represented geometrically by the line KK in Figure 1. The legitimate set is then the area abc formed by the constraints of this line and the two axes.

Expected Rate of Return Relationship. After establishing the constraints above, each security can be weighted in accordance with its expected return. The summation of all $x_i r_i$ will yield the expected return R, for the entire portfolio. As the proportions of each security are varied for a given value R, a loci of points is generated, all of which contain the same expected return. Markowitz calls these loci of points iso-mean lines. Thus, for each R specified by the individual, different iso-mean lines are generated as shown in Figure 1. In this manner, it is also possible to show the direction of R.

Variance of Rate of Return Relationship. It was stated earlier that the value of the variance V for the entire portfolio involved an n x m matrix. Because of this, there are squared values for x_j contained in the matrix and when plotted geometrically, these form ellipses, which Markowitz refers to as iso-variance curves (see Figure 2).

If the expected return lines are now superimposed on the variance of return ellipses it is possible to determine those combinations of x_i within the feasible region which are efficient. This means that for any given ellipse, that point which lies on the expected return line having the highest R value should be chosen. This is clearly the point of tangency between the particular ellipse and an

Figure I - Legitimate Set and Iso-mean Lines

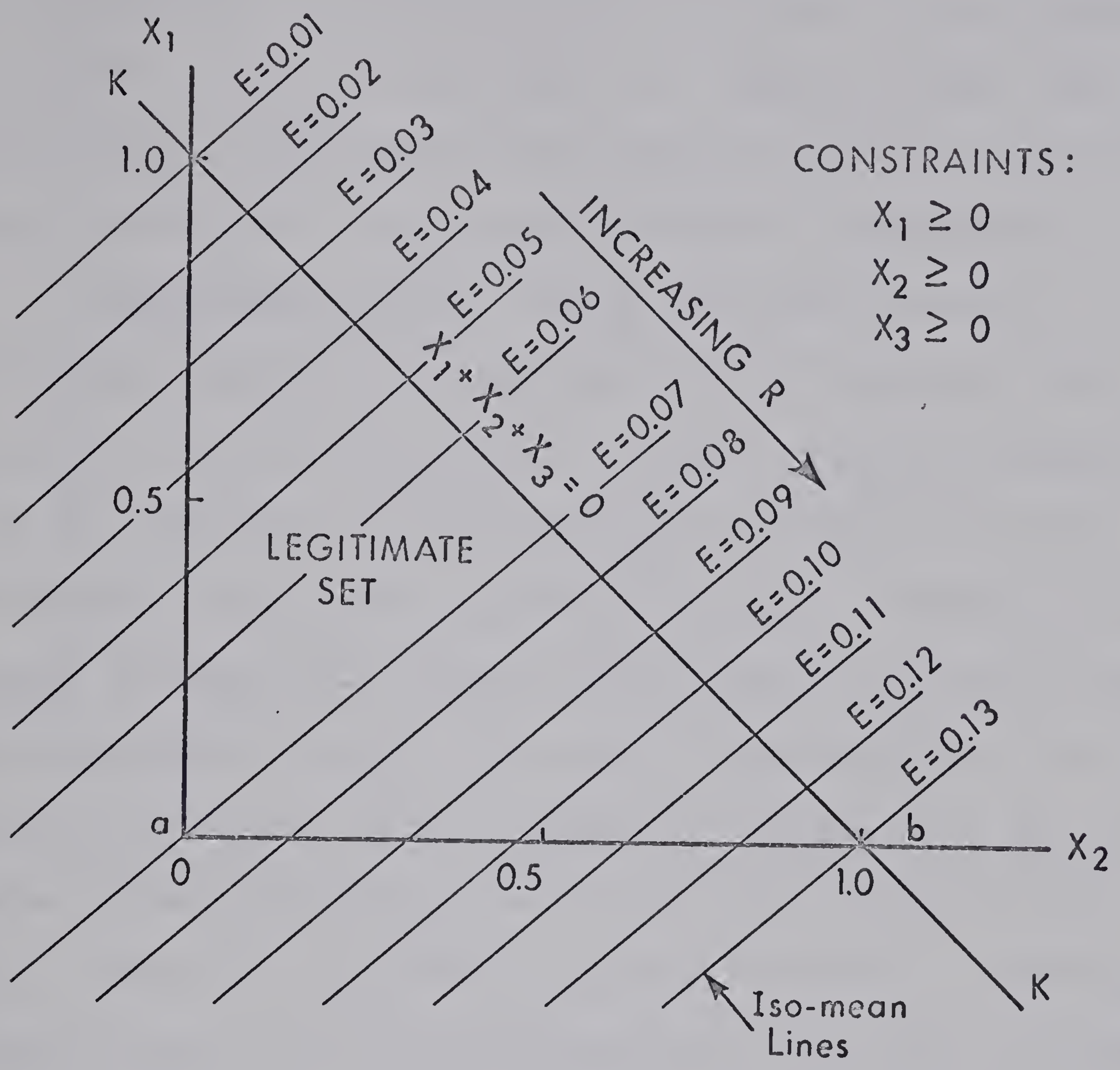
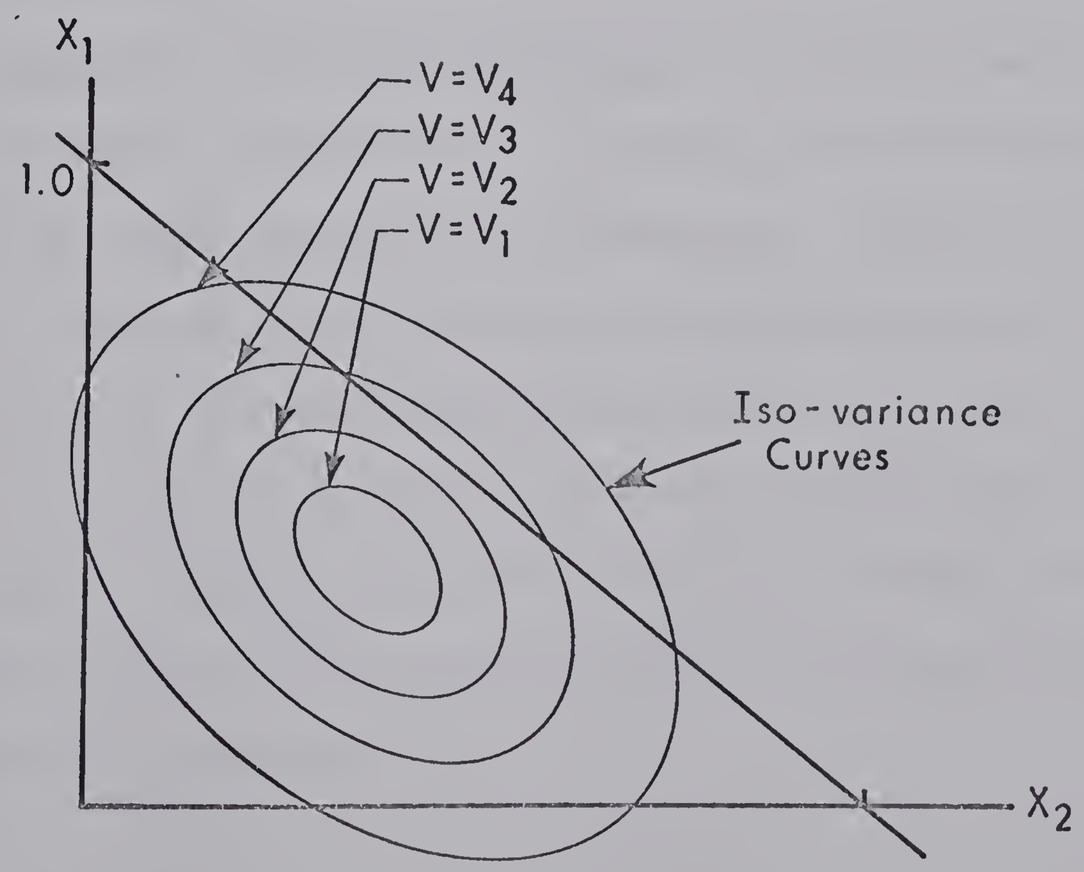


Figure II - Legitimate Set and Iso-variance Curves



expected return line. Markowitz refers to the loci of such tangency points as the critical line (see Figure 3). Notice, though, that this line starts at the centre of the ellipse pattern (the point of smallest variance) and travels in the direction of increasing R.

Efficient Portfolios. Having established the above relationships, Markowitz formulates three criteria which must exist to constitute an efficient portfolio. First, any point of tangency between the iso-variance curves and iso-mean lines must lie within the boundaries constituting a legitimate portfolio. Secondly, if any legitimate portfolio has a greater expected return, it must also have a greater variance of return. The final criterion is simply the converse of the second; if any legitimate portfolio exists that has a smaller variance of return, it must also have a smaller expected return. Within the legitimate set, then, a portfolio is considered efficient if there is no alternative portfolio with either (a) higher return and lower risk, (b) same return and lower risk, (c) higher return and same risk.

Portfolios Involving N Securities. When the number of securities available exceed three, the adoption of sophisticated techniques and complex mathematics is imperative. However, the principle of deriving the efficient set of portfolios remains unchanged and can be represented geometrically by a curve (see Figure 4). Generally, the only restriction on this curve is that it will have a positive slope. Having derived this curve, or "efficiency frontier", it is simply a matter of the investor choosing a portfolio according to his individual preference.

Figure III - Geometric Illustration of the Critical Line

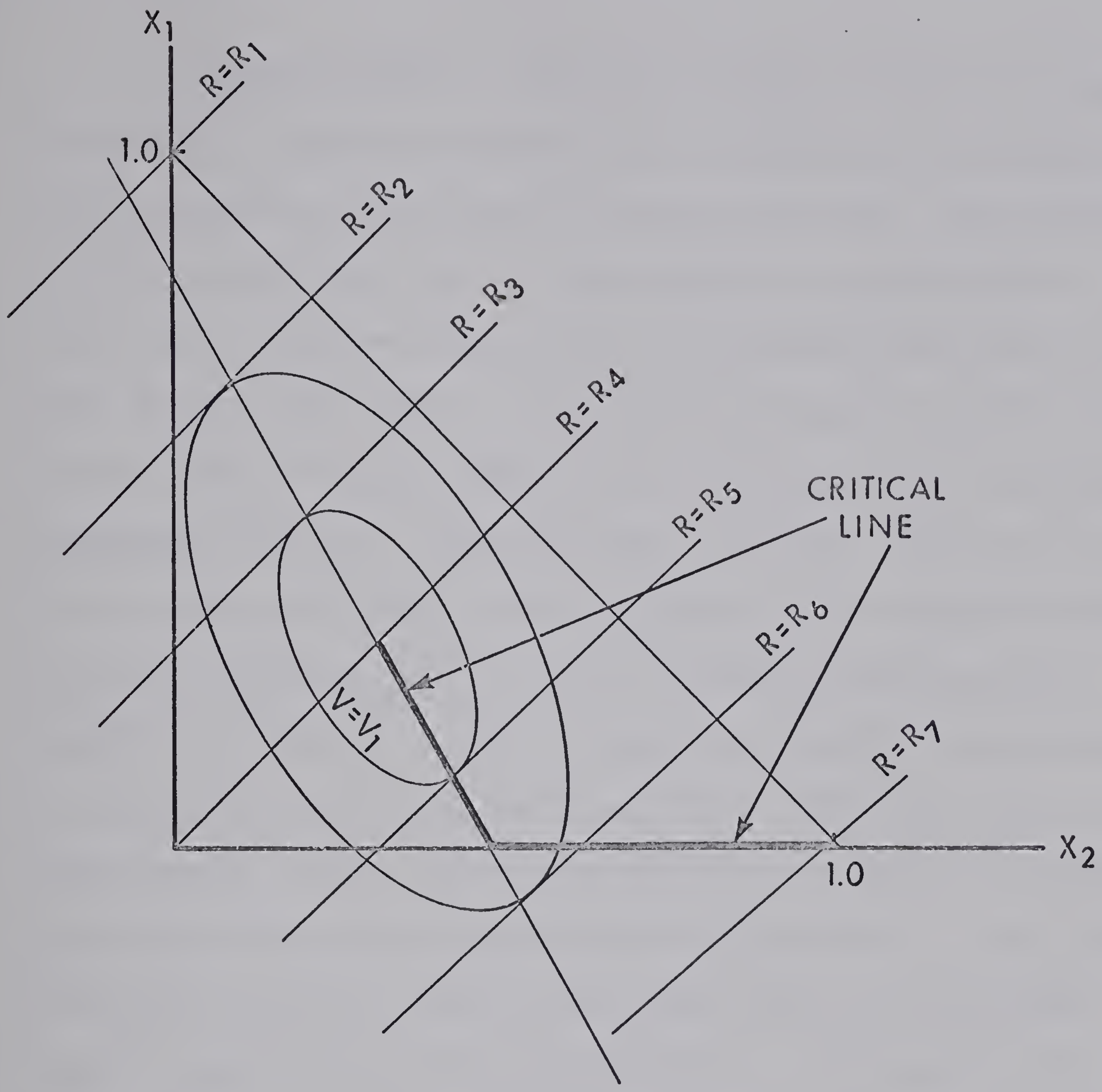
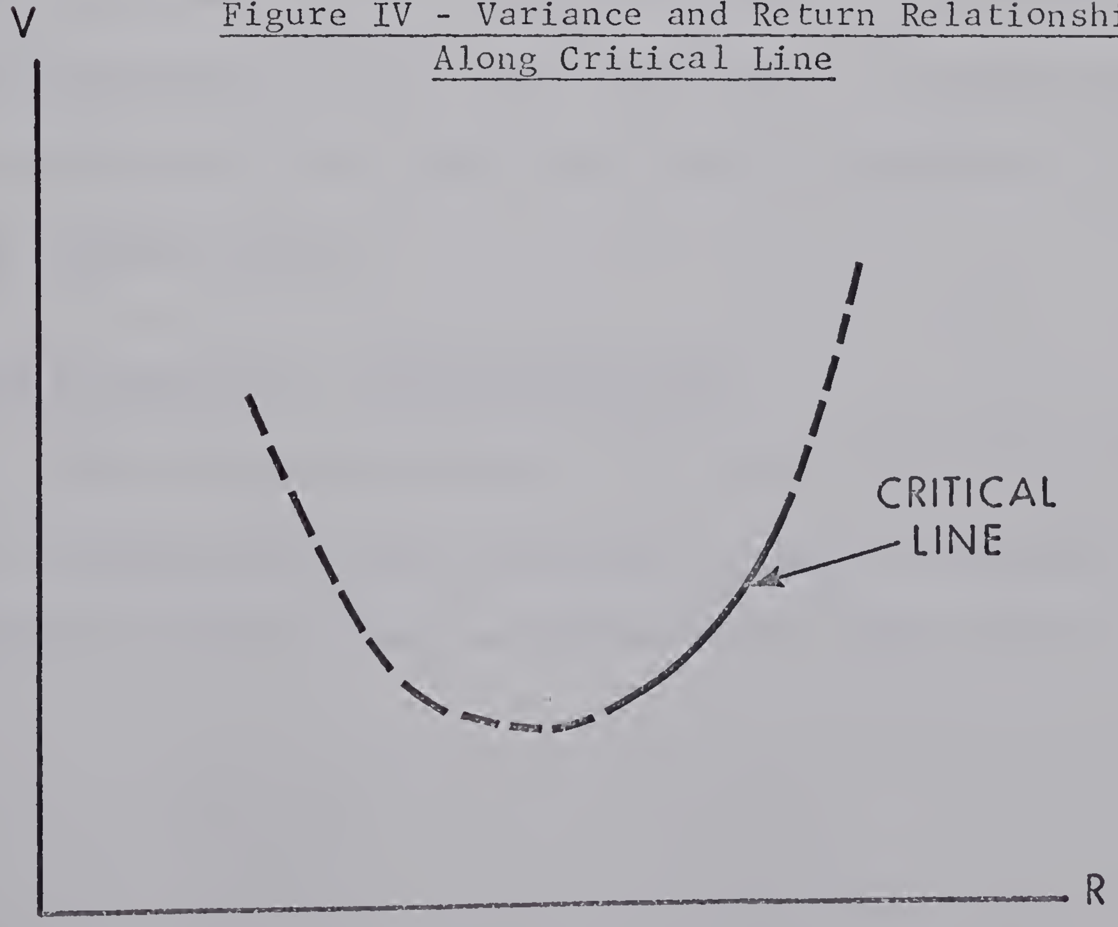


Figure IV - Variance and Return Relationship Along Critical Line



Summary of Model. Before one condemns the model too harshly because of its limiting assumptions, the main theme of the geometry and analysis presented above should be clearly understood. The key message is that diversification appears to be warranted in any portfolio selection, not only for the selection of the proper securities, but also, for the right reason. The selection of proper securities that form the efficient set is simply a matter of manipulating the quadratic programming function. The right reason, of course, hinges on the fact that investors are "risk averters" and for any given expected return, they wish to minimize risk. The model implicitly performs this operation by achieving as small a variance as possible associated with any expected return for the entire portfolio. This means that, to the highest degree possible, those securities that are highly correlated with other securities are eliminated from the portfolio. This leaves only those securities in the portfolio that tend to vary inversely with one another but in the right proportion. Consequently, if security prices and therefore expected returns are extremely volatile, the risk associated with the entire portfolio is averaged-over. It should be noted that this effect will prevail regardless of the given level of expected return.

Selection of Portfolios from Efficient Set

"The introduction of risk into a decision-making model of the investor has generally been accomplished by describing risky outcomes as probability distributions and choosing from among alternate possible

distributions by the expected utility hypothesis."[6] Perhaps this is the conceptual foundation for describing investor behavior but as one writer remarks, "A man who seeks advice about his actions will not be grateful for the suggestion that he maximize expected utility."[7]

At least the E-V model presents the investor with alternatives measured by criteria that are meaningful and familiar to him. As mentioned before, though, the choice of any particular portfolio will depend upon the preferences of each investor. Exactly what they are, however, is almost impossible to determine because the conditions influencing risk preference cannot be objectively quantified without resorting to some form of utility analysis. The best that the E-V model could do for the investor is direct him towards those combinations of portfolios at the low end of the efficiency frontier if he is conservative. On the other hand, if the investor has a high propensity to gamble, those combinations of portfolios high on the efficiency frontier would be suggested.

Limitations of the E-V Model

All theoretical models, to some extent, deviate from the conditions of the real world. Markowitz's model is no exception. The following discussion enumerates some of the difficulties and limitations of the E-V model when it is cast into a positive role of portfolio selection.

Measurement Problems. Any measurement criterion must be

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[6] Rudolph J. Freund, "The Introduction of Risk into a Programing Model," Econometrica (July, 1956), pp. 253-263.

[7] A.D. Roy, "Safety First and the Holding of Assets," Econometrica (July, 1952), p. 443.

considered in terms of the validity and reliability of the data it produces. In this respect, the mean expected return and standard deviation of return is questionable because of the subjectivity involved in estimating these values by the security analyst. As was mentioned earlier though, the investor, for the most part, has to rely heavily on the judgment and expertise of the analyst and, even then, opinions will vary among analysts.

Whatever the case, there does not appear to be any method available which escapes the use of probability estimates for determining future values. As well, there is no guarantee that such estimates are normally distributed, which the E-V model assumes. Thus, other statistical models that incorporate a skewed distribution may be considered more appropriate. In fact, Baumol[8] suggests that using any variance as a measure of risk creates paradoxical cases in the efficient set from which the investor must make his choice.

Even if a normal distribution is considered apropos, investors are often concerned primarily with the mean expected return not being attained or, in other words, the "downside loss" which would require the use of semi-variance to measure risk. Markowitz does not completely overlook this criticism but suggests that several conflicting considerations influence the choice of the measure of variability.[9] These considerations include cost, convenience, familiarity and the desirability of the portfolio produced by the analysis.

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[8] William J. Baumol, "An Expected Gain-Confidence Limit Criterion for Portfolio Selection," Management Science (October, 1963), p. 174.

[9] Harry Markowitz, op. cit., pp. 193-194.

Another problem which emerges concerns the potential return that the investors expect to receive. For example, some investors are interested primarily in the flow of dividends whereas others are concerned mainly in the capital appreciation of securities. Markowitz's model does not differentiate which type of return will occur.

A Static Model. The E-V model cannot cope with the dynamics of the real world and must therefore consider a single period of time. This means that all securities comprising the portfolio are purchased at the beginning of the time period and held for the duration of the period, at which time they are all sold. This holding constraint would place the investor in a somewhat undesirable position because several factors may warrant the termination of the portfolio at any particular moment during the period. For example, personal needs may force the investor to liquidate before the anticipated return has been realized. A sudden market upswing, however, may create just the opposite effect and it would be foolish if the investor were not able to liquidate and realize more income than he had anticipated.

The time period selected also causes repercussions on the actual performance of the portfolio. There is a greater probability of the portfolio moving away from the efficiency frontier and thus reducing expected returns when the time period is increased. On the other hand, if the time intervals are too short, the transaction costs (which are not considered in the E-V model) of exit and re-entry associated with each new efficient set would substantially reduce the expected return.

Computing Time and Cost of the Efficient Set. Most of the problems discussed so far have been theoretical in nature but the impli-

cations of practical application should not be overlooked. For example, portfolio selection from among one hundred available securities would require the security analyst to estimate 100 expected returns, 100 variances, and 4950 covariances. This would be a difficult task for the most qualified staff of analysts. One source states that:

> the enormity of the problem taxes the memory capacity of even the largest computer. The IBM 7090, one of the largest and fastest modern computers can handle a total of only 300 securities. A computation time of 90 minutes is required to obtain the solutions to such a problem.[10]

However, with the new third generation computer now available, such as the IBM 360-67, computation time is approximately 1000 times faster.

Certainly the cost of such resources would be tremendous, especially if the time periods involved are relatively short. But, in view of the high sums invested annually in securities, perhaps such costs should not be considered as a deterent factor in using the E-V model for selecting portfolios.

Extensions of the E-V Model

There are several approaches that one can take regarding the model developed by Markowitz. There is the theoretical aspect and its counterpart, namely, some possible application at the practical level. We can consider the approach to the latter as being either normative or positive. If we stipulate that one ought to consider portfolio selection on the basis of expected return and variance of returns, then we

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[10] Buckner A. Wallingford, "A Survey and Comparison of Portfolio Selection Models," Journal of Financial and Quantitative Analysis (June, 1967), p. 95.

have a normative theory. If, alternatively, we hypothesize that this is the way investors do, in fact, behave, then we have the basis for a positive theory. Several economists have adopted the latter approach in an attempt to formulate a positive economic theory to deal with conditions of risk.

Tobin,[11] for example, introduces utility curves in conjunction with the efficiency frontier and arrives at the choice of the optimum portfolio mix. In addition, he expounds on the choice of how much to invest in this portfolio.

Sharpe,[12] extends the model presented by Markowitz and Tobin and shows how equilibrium prices are attained in a capital market where there is a choice between a combination of risky assets and a riskless asset (yielding the pure rate of interest). Interestingly, this model shows that many alternative combinations of risky assets are efficient. This outcome contradicts Tobin's conclusion that there will be a unique optimal combination of risky assets. Sharpe also suggests that since such combinations are perfectly correlated because of their linearity, this provides a key to the relationship between the prices of capital assets and different types of risk.[13]

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[11] J. Tobin, "Liquidity Preference as Behaviour Towards Risk," The Review of Economic Studies (February, 1958), pp. 65-86.

[12] William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," The Journal of Finance (September, 1964), pp. 425-442.

[13] Ibid., p. 435.

Sharpe pursues the above premise by considering the relationship between expected return and standard deviation for individual assets. To explain his analysis, Sharpe follows the suggestion of Markowitz[14] that investors can simplify their decisions in selecting a portfolio by thinking of the regression of each security's rate of return on some general index. This model is often referred to as the diagonal model.[15]

The diagonal model recognizes that the total risk of an asset can be divided into two component parts: the risk associated with general economic and business conditions and the uncorrelated risk of individual securities. Lintner[16] expounds on this concept of total risk in attempting to construct a theory which would give the market equilibrium prices of assets.

On the practical side, the benefits that arise from using Markowitz's model hinge on the gains accruing to the investor from diversification. If diversification reduces total risk and/or increases expected returns, then, it would seem desirable to implement it in the real world, provided such benefits are greater than the cost of obtaining this information.

Gains from Diversification. The key to any gains from diversification among securities lies in the stability of their expected returns. The logical question to then ask is what factor or factors

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[14] Harry Markowitz, op. cit., pp. 98-102.

[15] William F. Sharpe, "A Simplified Model for Portfolio Analysis," Management Science (January, 1963), pp. 277-293.

[16] John Lintner, "Security Prices, Risk, and Maximal Gains From Diversification," The Journal of Finance (December, 1965) pp. 587-612.

determine this stability. Sharpe[17] and Lintner[18] suggest that there are two variances or risk factors involved; one is called the "systematic risk" and the other "residual risk".

"Systematic risk" is the variance which arises due to the fact that any predicted return is strictly dependent upon some market condition or influence. The market condition may assume a variety of forms, but for purposes of measurement, it is usually expressed in terms of some general market index such as the Dow Jones Industrial Average or Standard & Poor's 425 industrial stock prices. "Residual risk", on the other hand, is the variance attributed to some factor or factors apart from general business conditions. For example, a company may introduce a new product or change the management structure, either of which may change the expected return and thus the variance. Consequently, "whenever an investor buys some of any stock, he is buying a composite product made up of the returns and risks of the general index, on the one hand, and the independent returns and risk (the residual variance) on the other."[19]

If the relationship between expected returns and some general index is perfectly correlated, then the independence variance is non-existent. Consequently, the ratio of the expected rate of return to

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[17] William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," The Journal of Finance (September, 1964), pp. 425-442.

[18] John Lintner, *op. cit.*, pp. 587-612.

[19] Ibid., p. 609.

the variance for any security would be identical. This result would be the same, of course, for any combination of securities contained in a portfolio. In this case, there would be no gains from diversification.[20]

Just the reverse would be true if there were no systematic risk. In this situation there would be no relationship between the expected returns or variance for any of the securities. This means that for some securities, the expected return could be high with a corresponding low variance, while for others, the return might be low and the variance high. To achieve any stability in a portfolio composed of these types of securities, it would be necessary to combine the variance possibilities and thus diversification would be desirable.

From a theoretical point of view, it would appear that diversification will not eliminate any of the risk resulting from the swings in economic activity.[21] This is true because any index or measure chosen is only a probabilistic estimate of the "true index"and therefore there is no "standard of comparison". Thus, according to Lintner, the only risk that can be resolved is the "residual risk", and even at that, it can never be reduced completely.[22]

Empirical Evidence for Diversification

Very little research has been conducted in testing the E-V

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[20] Ibid., p. 610.

[21] Ibid., pp. 609-610.

[22] Ibid., p. 610.

model, possibly, because of its complexity. However, Farrar[23] attempted to compare the actual portfolios held by mutual funds to the risk-return characteristics generated by the model. His findings were rather surprising in that the various risk classes of portfolios actually held by the mutual funds corresponded almost perfectly with those of the efficient portfolios generated by the model.

Instead of using the full covariance model of Markowitz, some studies have employed the diagonal model. The virtue of using this model is evident if one realizes that it requires only one percent of the total calculations used in the E-V model. Herein lies the disadvantage of the diagonal model. It uses only one covariance comparison (this is comparing all the securities to some economic index) and therefore loses some information and objectivity. The resulting efficient set is thus generally inside the efficiency frontier developed by the E-V model.

Lintner[24] mentions a study of 301 securities using the diagonal model which reveals significant results in indicating the importance of the total risk factor in diversification. Using the Standard & Poor's index and regressing the past performance of the securities, the study indicated that less than fifty percent of the variances were explained by the index in approximately eighty percent of the securities.

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[23] Donald E. Farrar, The Investment Decision Under Uncertainty (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965).

[24] John Lintner, *op. cit.*, p. 611.

RELATIONSHIP OF DECISION MODELS TO FINANCIAL ACCOUNTING

Several inferences can be drawn from the premises underlying investor decision models which have been discussed thus far. In the first place, rational economic man strives to maximize the return from his investment activity subject to some level of risk preference. The personal attributes of the investor are paramount in determining this objective since each investor's aspiration level may be different.

Secondly, the extent of goal attainment on the part of the investor is dependent upon the future behavior of the decision criteria. The decision criteria are the future values of securities which are available for investment purposes. However, the degree of error in predicting the decision criteria is dependent upon variables inherent in the environment. A portion of this error may be reduced through the process of diversification. Finally, the investor's knowledge pertaining to the environmental decision variables is virtually dependent upon current information.

The question which still remains, though, is how and to what extent do these conclusions tie in with financial accounting? A plausible answer begins with considering the nature of risk and its relationship to the economic value of the firm.

Portfolio Theory and Capital Budgeting

Ball and Brown[25] provide an excellent exposition on the implication of portfolio theory for accounting information and the

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[25] Ray Ball and Philip Brown, "Portfolio Theory and Accounting," Journal of Accounting Research (Autumn, 1969), pp. 300-323.

investor decision problem. To understand how portfolio theory relates to the conglomerate disclosure controversy it is necessary to digress momentarily and elaborate on the concept of capital budgeting.

Capital budgeting decisions made by firms simply involve the investment in various assets under conditions of uncertainty. The fundamental proposition of capital budgeting is that a firm should invest in an asset if the required rate of return, i.e. cost of capital, is less than or equal to the anticipated future expected rate of return. This proposition is based on two primary assumptions: (1) an equilibrium pricing mechanism exists in the market; and (2) capital markets are efficient, i.e. profit opportunities are quickly adjusted by claims in the market.

Ball and Brown, in using the diagonal model of portfolio theory, suggest that the cost of capital is a function of the residual risk of an asset and the potential risk premium desired by present and potential risk investors in the firm.[26] Furthermore, by maximizing its own value, which is the future stream of uncertain earnings from assets, "the firm accepts the utility functions of investors, and by translating these into the investment decision it maximizes their utilities."[27] The risk of the firm then, is the risk of its aggregate earnings stream, which in turn is the aggregate of the earnings' streams of individual claims. The question which arises though concerns how this risk for the firm is determined. Ball and Brown, in interpreting

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[26] _Ibid_., p. 308.

[27] _Ibid_., p. 309.

the capital asset pricing model developed by Sharpe[28], conclude the following:

> Portfolio theory thus implies that one can ignore both the variance of the firm's total anticipated return from all projects and any one project's individual effect upon the variability of the firm's anticipated total return. Covariance with all other assets in the economy is the important determinant of risk.[29]

This conclusion has significance for segmented financial reports.

Portfolio Theory and Segmented Financial Reports

The main theme of the Ball and Brown analysis is that various risk classes are generated within a firm's holding of assets. These risk classes are determined by the covariance of the assets' returns with those of the market. Because of the role which investors play in the market, there is no reason to assume that they will each attach the same risk premium to the assets held by the firm. Nor is there justification in concluding that the residual risk factors associated with each asset in the firm are equivalent. In fact there is general agreement that management ability does differ among individuals and among firms as a whole.

Since conglomerates are involved in a diversity of activities, their assets are not necessarily homogeneous. Therefore, the combina-

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[28] William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," The Journal of Finance (September, 1964), pp. 425-442.

[29] Ray Ball and Philip Brown, *op. cit.*, p. 300.

tion of all the assets results in a mix of all the risk classes that exist within the firm. However, the assets of any particular division or activity within a conglomerate, may be considered approximately the same with respect to their future expected earnings' stream. If this is the case, "there would be some advantage to reporting divisional performances separately insofar as divisions may be more representative of risk classes."[30] Whether or not investors would benefit from this knowledge is a moot point. To some extent, it involves other considerations, one of which is the relationship of financial statement information and the future value of securities.

Financial Statement Information and Decision Criteria

The decision criteria relevant to investors is the future value of securities. This simply reflects the fact that any return to investors is dependent upon price appreciation and the flow of dividends at some date after the initial acquisition of the stocks. Of course risk is a factor in the decision process; in particular, covariance among securities is what is relevant. Unfortunately though, covariance is a second order variable and thus is dependent upon variance. This means that the investor cannot not avoid estimating expected returns and variances from different investment opportunities in the stock market. Consequently, future prices must also be estimated and this entails knowledge from current and past sources. Financial statements are an integral source in providing information for these estimates.

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[30] *Ibid.*, p. 313.

What items in particular from financial statements are significant to this purpose? At a rudimentary level, two major schools of thought exist regarding the primary basis of common stock valuation. One widely accepted tenet is that a common stock is worth the sum of its discounted future cash receipts in the form of dividends and cash proceeds from its eventual sale.[31] Calculating the worth of such dividend flows poses two difficulties for the investor. One is the need to estimate the potential growth rate per annum of the expected dividend income. Secondly, some discount rate must be chosen that reflects the risk in undertaking common stock investment.[32] The important point here is that any anticipated changes in the expected cash receipts from dividends are reflected in the prices of common stocks. But ascertaining any changes in dividend income is directly linked to information relating to the financial operations of the various companies under consideration.

Thus, the second major school of thought emphasizes the earnings approach in valuing common stocks. The attitude of investors who adopt this approach is that future earnings potential and current profitability, i.e. net income, are the prime determinates of common stock values and not future dividend flows. In the writer's opinion, both arguments represent a vicious circle. It is difficult to understand how one approach or the other could be disregarded in valuing

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[31] W. Scott Bauman, "The Investment Value of Common Stock Earnings and Dividends," Financial Analysts Journal (November-December, 1965), p. 98.

[32] Jerome B. Cohen and Edward Zinbarg, op. cit., pp. 222-225.

common stocks. What does emerge implicitly in these two different views, however, is the use of significant financial statement items such as income, capital, and dividends. This seems appropriate since these items reflect information necessary for estimating future earning power and dividend growth.

In sum, theory suggests that there is a high correlation between the value of common stocks and the earning power of the firm. The rationale behind this statement is that the resources of a firm, as measured by its assets, provides the basis for potential earning power. It is this future earning capacity which causes assets to have a value that can be transmitted to stock prices.

In reality, however, the intrinsic value of the firm is of an indeterminate magnitude. Nonetheless, accounting measures are incorporated which approximate the intrinsic value of the firm as reflected in the balance sheet of a company at a point in time. The income statement reflects the change in these asset values during some interval of time. What is more important, though, is that investors rely on the information communicated in the financial statements for their forecasting needs.

SUMMARY

Portfolio theory provides a specific investment framework for applying and quantifying some of the principles pertinent to investment decision theory. In particular, it reveals the objectives, decision criteria, and decision variables relevant to the investor's decision situation.

Special emphasis is focused on the E-V model originally developed by Markowitz. It forms the core from which other portfolio

models are developed, such as Sharpe's diagonal model and the theory of capital asset prices.

Portfolio theory is pertinent to the discussion of the conglomerate disclosure controversy because it deals with information and uncertainty in investor decision-making. Specifically, portfolio theory provides a framework for analyzing conditions of risk in a hostile environment.

The most important determinant of risk is the covariance of an asset's expected return with the anticipated return from each other asset in the environment. In security portfolios, covariance is the fundamental premise underlying the principle of diversification.

Portfolio theory has certain implications for accounting information. In the first place, accounting reports can provide information to the capital markets for assessing the estimates of covariances of expected returns from a firm's assets. This simultaneously imputes a price of risk on the residual risk inherent in the firm and on the risk premium sought by investors. In a normative sense, this price of risk becomes the cost of capital to the firm and it is directly linked to the price of risk in the market. Consequently, a base is formed for the suggestion that segmented financial reports by risk class may benefit investors. Hypothetically, this type of information decreases uncertainty by reducing the variance of asset values and returns. This identical effect is transmitted to the variances of securities in the market. Accordingly, the risk attached to any security is reduced and correspondingly the investor's portfolio becomes more stable, i.e. the variability of expected future returns is decreased.

Equally important to the investor is the problem of estimating the future prices of securities. It is from this criterion that the

other parameters of the decision problem are drawn, i.e. the variance and covariance of expected returns. Again, financial statements provide the source for gathering information relative to these parameters. Income, dividends, and capital, are the dominant financial statement items in this respect.

To the extent then that distortion in approximating the real economic position of the firm can be reduced, the usefulness of financial statement information is enhanced. This aspect of alternative accounting measurements is pursued in greater detail in Chapter VI. However, at this point a closer look reveals matters which remain somewhat obscure. That is, investors seek information - with emphasis on financial statement items - which will help them forecast the future behavior of stock values. But is there any evidence that such a decision criterion can even be predicated with any degree of accuracy or consistency? If not, then the value of financial statement information is questionable as well as other efforts expended by the investor in his search activity. Since the nature of stock price behavior is fundamental in resolving this issue, the following chapter is devoted to a discussion of the predictability of stock price movements in the market.

CHAPTER V

THE BEHAVIOR OF STOCK MARKET PRICES

The central observation of the last chapter, in addition to suggesting the variables which are most relevant to investment decisions, stressed the importance of information. Financial statements, as a source of information, were seen to be instrumental in facilitating investment decisions. They not only contain significant items for estimating future returns, but as well, financial statements exhibit the potential for distinguishing the risk classes among assets. Both of these aspects can be considered useful for investment decision-making.

The problem in the conglomerate disclosure controversy concerns the demand by investors for segmented financial statements. Investors sense that insofar as the operations of a firm are reported in total for the entity, their needs are inadequately served. The evidence presented thus far in the thesis appears to be biased in favor of the investors' claims, at least at the normative level. This development has not been intentional. However, it would be erroneous to conclude at this point that all of the relevant issues have been resolved.

One aspect of the conglomerate disclosure controversy has not yet been examined and perhaps it is the most crucial link in the discussion thus far. It involves the nature of stock market price behavior. Specifically, how does information influence the movements of stock prices, what impact does this have on investor decision-making, and what are the implications, if any, for segmented financial statements? These questions are invoked mainly in response to several theories which

are prominent in the financial literature. The theories imply that because future price movements are random variables, financial statement information has little significance for investor decision-making. This conclusion would be correct if the sole criterion in decision-making was the predictability of future stock prices.

A discussion of the behavior of stock prices is thus important at this point. First, it dismisses the notion that predictability is the sole criterion in investor decision-making. Instead, it will be seen that expectations pertaining to the decision variables of return and risk are the dominant criteria of decision-making. In turn, this development lends credence to the basic premises of portfolio theory. Finally, an integral aspect of forming expectations requires some standard for comparison purposes. Financial statements serve exactly this role. Moreover, it should be kept in mind, that financial statements not only communicate financial data, but they reflect the quality of management. This too, as will be shown, has a bearing on segmented financial statements.

Thus, the purpose of this chapter is to (1) discuss several theories pertaining to the nature of stock market price behavior; (2) examine the impact of these theories on investor decision-making; and (3) to re-examine the role of financial statements in investor decision-making.

THE APPROACH OF PROFESSIONAL ANALYSTS

There are a number of procedures and methods used by investors to analyze stock price behavior. Several of the procedures and methods

are well-known to all investors; the remainder, however, constitute "ad hoc" rules which are designed in a vain attempt to "beat the market averages". Categorically, though, two major groups exist among professional analysts that are clearly discernible in their approach to analyzing stock market price behavior. There are the "chartists" or "technicians", as they are often referred to, on the one hand, and "fundamentalists" on the other.

Technical Analysis

The central focus of the technical approach is on studying phenomena which are an integral part of the market mechanism. Such phenomena may include, for example, breadth of market analysis, volume, price, short selling, odd lot trading, relative strength analysis, and credit balances in brokerage accounts. By analyzing these factors which are common to the market, the analyst seeks to discover important relationships which may provide clues to the movement of stock prices in the immediate future.

Assumptions of the Technical Approach. The prime assumption of the technical analyst is that pertinent information exists in the market which is capable of generating trends indicative of the future path of stock prices. Technicians believe that because information in the marketplace is imperfect the future trend of prices will result from a gradual spread of awareness of this information throughout the market. Therefore the key to any gains lies in unfolding the critical relationships of prices and other market data earlier than anyone else.[1]

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[1] Sidney S. Alexander, "Price Movements in Speculative Markets: Trends or Random Walks" in The Random Character of Stock Market Prices, edited by Paul H. Cootner (Cambridge: M.I.T. Press, 1964), p. 199.

The above assumption can be expressed in a slightly different manner. "Technical analysts study internal stock market data in an attempt to gain insight into what economists call the 'supply and demand schedules' for a stock or for the stock market as a whole."[2] An integral part of the supply-demand relationship is the equilibrium price. Changes in the equilibrium price of course are dependent upon causal variables which in turn are manifested in changes in the supply and demand functions. Analysts, or at least technicians, do not directly attempt an analysis of the causal variables but rather, they concentrate on the patterns reflected in the movements of prices.

An implicit assumption emerges if this brief description of the technician's behavior proves to be correct. The technician attempts to use patterns or relationships of past price movements, generated from phenomena common to the market, to predict future stock prices. In other words, history will tend to repeat itself and price patterns that have occurred in the past will tend to recur in the future. To use the statistician's terminology, this implies dependence in successive price movements. As Fama notes "the various chartist theories assume that the sequence of price changes prior to any given day is important in predicting the price change for that day."[3]

Implications for Segmented Reporting. Based on the premises of the technical analyst, financial statements of any description appear

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[2] Jerome B. Cohen and Edward D. Zinbarg, op. cit., p. 503.

[3] Eugene F. Fama, "Random Walks in Stock Market Prices," Financial Analysts Journal (September-October, 1965), p. 55.

to be left entirely out of the decision-making process. In reality, though, such a presumption seems very untenable, as Cohen and Zinbarg indicate:

> The ideal procedure for a technical analyst is to lock himself in a room with only his charts and market statistics, preferably unidentified as to company or industry to prevent the interference of preconceived notions about prospects for sales, earnings, and dividends.
>
> ....
>
> ... But .... The more scholarly and sophisticated analyst ... is certainly not unmindful of earnings growth, of "values", or of the import of business cycles.[4]

In fact, preconceived notions of the cost/revenue relationships of the past would seem to prove very helpful. They would give the technician some idea of the impact that "future random changes" will have on a company's income and cash flow. Segmented financial reports would give a more minute breakdown of a firm's cost/revenue relationships.

Fundamental Analysis

The proponents of this school of thought, as opposed to the technical analysts, approach the problem of determining stock price behavior by considering phenomena which are external to the market, *per se*. Instead of concentrating on the movements and relationships of prices to market data, the fundamentalist engages in search activity in an attempt to determine what he believes to be the causal factors which account for the patterns of price behavior. Thus, factors such as business cycles, monetary and fiscal policies, aggregate production levels for the economy, industry analysis, the quality of management

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[4] Jerome B. Cohen and Edward D. Zinbarg, *op. cit.*, p. 531.

and financial statement data are the major targets for analysis. The overriding belief of the fundamentalist is that a concerted investigation of such factors will lead him to approximate the intrinsic value[5] of the securities in question.

Assumptions of the Fundamentalist. Such a belief by the fundamentalist is based on two main assumptions, one of which is explicit while the other is implicit. According to Fama:

> The assumption of the fundamental analysis approach is that at any point in time an individual security has an intrinsic value (or in terms of the economist, an equilibrium price) which depends on the earning potential of the security.[6]

The implicit assumption of the fundamentalist is basically identical to the one of the technician. That is, the fundamentalist assumes that a dependent relationship exists between future security prices and past price patterns based on the causal factors underlying the intrinsic value of the stock prices.

Implications for Segmented Reporting. The fact that fundamental analysis focuses on the intrinsic value of stock prices seems to signal some importance for financial statements. This inference is related to the idea - at least in theory - that the current intrinsic value of a stock is dependent upon the earning potential of the firm

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[5] Intrinsic value as used in this thesis refers to the expected rate of yield through time of any asset or group of assets as determined by the forces of supply and demand in the market and reflected in an equilibrium price for the asset(s). In reality, this equilibrium price is hypothetical since the potential earning power of any asset(s) can only be estimated in light of future economic phenomena in the market. For this reason, the actual prices of asset(s) are said to be, at best, approximations of an asset(s) intrinsic value(s).

[6] Eugene F. Fama, op. cit., p. 55.

which in turn is transmitted in actual stock prices. Of course the exact earning potential, and therefore the intrinsic value of a security, can never be known for certain in a world with imperfect information. However, financial statements are one dominant means of providing objective data from which the investor forms his expectations of the intrinsic worth of a stock.

The investor is certainly liable to human error in forming his expectations on the earning potential of the firm. But if significant information is available on the approximate earning potential of the firm and it is not disclosed in the current financial statements, the expectations of earning power formed by the investor could be greatly distorted. This lack of information which the investor feels impairs his judgment in forming expectations about the earning power of the firm is the central issue of the conglomerate disclosure controversy. The difficulty which remains, however, is determining what role "expectations" play in the light of financial statement information.

THE THEORY OF RANDOM WALKS

The random walk theory of stock market price behavior is a radical departure from the schools of thought of the professional analysts. An increasing number of scholars and academicians are expressing the view that the future time-path of stock prices are no more predictable than a series of cumulated random numbers. In essence, this means that history does not repeat itself; knowledge of the past behavior of stock prices cannot be used in any meaningful way to predict future sequences of stock price changes.

The implications of the random walk theory on the professional analyst's approach to stock price behavior are somewhat appalling at first blush. If the former theory is correct, then the efforts of the latter group are completely without foundation. The plausibility of this result is based on one tenet of the random walk theory which suggests that any deterministic prediction will, on the average, do no better than a random forecast. This raises serious doubt as to the validity of financial statement information.

Analysis of the Random Walk Theory

The main premise of the random walk theorists is that the major exchanges constitute a "perfect" or "efficient" market. Fama defines an efficient market as:

> ... a market where there are large numbers of profit maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants.[7]

Concomitant with the assumption of efficient markets are two separate hypotheses: (1) successive price changes are independent; and (2) the price changes conform to some probability distribution.[8] The arguments behind these two hypotheses require further explanation in order to analyze the implications of the theory on accounting information.

Independence. At any point in time, actual prices exist for various securities within the market mechanism that reflect all the

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[7] Ibid., p. 56.

[8] Eugene F. Fama, "The Behavior of Stock Market Prices," The Journal of Business (January, 1965), p. 35.

current information based on past events and anticipations of future events. Simultaneously, an intrinsic value exists for each stock that is dependent upon causal variables inherent in the economy. Furthermore, the random walk theory suggests that the behavior of investors initiates oscillations in the actual prices about the intrinsic values of the securities.

The fluctuation of actual prices above and below the intrinsic values is a result of two different processes. One of the processes occurs when noise is generated in the market. Noise refers to the psychological and other such factors unique to each investor in the market that may cause him to react to certain buy or sell situations. The other process is the actual generationor appearance of new information in the market.

The arguments of earlier theorists, such as Bachelier, and later Osborne, assume that the information and noise generating processes are independent random variables and, therefore, successive price changes in common stocks will be independent. More recent thoughts, advocated by Mandelbrot and Fama for example, question such reasoning. Nonetheless, Fama suggests that even if the information and noise generating processes are dependent variables, there are neutralizing elements in the market mechanism which react against the dependent nature of these two processes. The consequence is that successive price changes still remain independent.

One example of a neutralizing element which Fama describes may be the existence of sophisticated traders. This concept means that some investors have a special talent in detecting dependencies

in a series of price changes or they have the faculty of predicting the appearance of new information and evaluating its effect on intrinsic values.

The Distribution of Price Changes

Markowitz's model reveals the importance of price distribution in determining the expected return and risk associated with investments in common stock. Although the random walk theory considers independence to be more important than distribution characteristics of stock price changes, the latter serves a key role in the present discussion for two reasons: (1) it provides insight for assessing the value of information; and (2) it helps establish the rationale for diversification in investor decision-making.

The primary argument in the random walk theory concerning the hypothesis of some probability distribution, is whether or not a market is Gaussian, i.e. normal, or stable Paretian. Although the intricacies of the voluminous empirical testing that has been carried out on both these points of view are interesting, it is the conclusions which are most relevant to this discussion. The important difference between the two types of markets is summarized by Fama:

> In a Gaussian market, if the sum of a large number of price changes across some long time period turns out to be very large, chances are that each individual price change during the time period is negligible when compared to the total change. In a market that is stable Paretian with $\underline{a} < 2$, however, the size of the total will more than likely be the result of a few very large changes that took place during much shorter subperiods. In other words, whereas the path of the price level of a given security in a Gaussian market will be fairly continuous, in a stable Paretian market with $\underline{a} < 2$ it will usually be discontinuous. More simply, in a stable Paretian market with $\underline{a} < 2$, the price of a security will often tend to jump up or down by very large amounts during very short time periods.

> When combined with independence of successive price changes, the discontinuity of price levels in a stable Paretian market may provide important insights into the nature of the process that generates change in intrinsic values across time.[9]

The exponent characteristic a is simply a measure of the height of the extreme tail areas of the distribution.

The summary by Fama means that price changes are inherently more risky in a stable Paretian market than a Gaussian market. Thus, in a stable Paretian market the variability of given expected returns and the probability of losses are both greater than in a Gaussian market. This composite effect is the result of a few large price changes during a short interval of time. Such indications clearly lend credence to the idea of diversification and the importance of information in investment decisions.

IMPLICATIONS OF THE RANDOM WALK THEORY ON ACCOUNTING INFORMATION

External financial reports should bear information that is useful to investors for decision-making. A general test of the usefulness of information depends on whether or not the information contributes to goal attainment in the decision activity of investors. Admittedly, this is an abstract generalization and the only practical way of observing any "goal attainment" by investors is through comparing posterior results to predetermined standards.

According to the random walk theory, the gains to be expected from a technical approach, or from the efforts of fundamental intrinsic

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[9] Ibid., p. 93.

value analysis, are no greater than the gains that would be obtained from a naive buy-and-hold policy. If this is actually the case, and the random walk theorists seem to have generated ample evidence that it is, then the information communicated in financial statements is of no value or usefulness. The investor will be just as well off if he chooses a stock on a random basis as if he had indulged in a rigorous, analytical program. An implicit assumption in this entire process, though, is that the investor's level of satisfaction in terms of goal attainment constitutes a return higher than what the market average would yield.

Value of Information

The evidence supporting the random behavior of stock prices compounds the complexity of attempting to explain the pricing mechanism in the market. If the behavior of prices simply conformed to the technical theories or valuation theories, one would expect that systematic behavior of stock prices would predominate over random movements of stock prices. But since this does not appear to be the case, it adds complexity to the entire decision problem of investors and also complicates the understanding of the role of information.

A further intriguing aspect of the random walk theory is the confirmation of independent price movements irrespective of the time dimension.[10] This discovery casts serious doubts on the belief of those proponents, such as fundamental analysts, who rely on a longrun

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[10] C.W.J. Granger and O. Morgenstern, "Spectral Analysis of New York Stock Market Prices," Kyklos (1963), pp. 17-18.

price-equilibrating process based on a firm's longterm earnings prospects.[11] In fact, the following observation by Baumol, lends credence to the seemingly futile function of any past information in investor decision-making:

> If investor's valuation of company stocks were affected only periodically by occasional pieces of information such as quarterly earnings reports, then stock prices should not behave randomly over the very short periods, i.e. for the period between the receipt of two such data. Yet, the evidence for the random walk hypothesis is apparently just as strong in the very short period case as it is for longer periods.[12]

While the arguments supporting the randomness of stock price movements seem to have merit, they fall short of adequately assessing the value of information in the market pricing mechanism. A closer analysis of the information absorption process by investors in the market reveals the nature of this shortcoming, which is grounded in the basic premise of the random walk theory, i.e. stock exchanges are assumed to be efficient markets.

One requirement of this premise is the idea that current information is freely available to all investors. In fact, this conception does not hold on two accounts. To begin with, the phenomena of "insider information" is a factor which must be considered in the market mechanism. As Godfrey, Granger, and Morgenstern point out:

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[11] William J. Baumol, The Stock Market and Economic Efficiency (New York: Fordham University Press, 1965), p. 42.

[12] Ibid., p. 42.

> 'Inside information' is defined as information held by only a small segment of the market which if generally known would produce a predictable price change. The profitable use of 'inside information', then, consists of acting on the basis of the prediction and then announcing, or awaiting the general realization of, the 'inside information'. Thus each bit of this information is self-destroying; a continuing flow of new 'inside information' is required for continuing profits.[13]

However, two factors limit the dispersion of inside information. One consideration is the limited cognitive rationality of the investor. It thus takes some period of time for the "insider" to comprehend the alternatives and consequences of any action which he takes. Of course, this serves to impede the rate at which the information is manifested in stock prices and therefore conveyed to other investors throughout the markets. Naturally the investor, or insider in this case, must have the resources to initially start such a chain reaction in the market. The second factor lies in the distortion and blockage of information that is inherent in any communication system.

The second reason for questioning the assumption of perfect markets is founded in the noise generating process which is apparently an integral component of the market mechanism. Recalling how this process was described earlier in the chapter, suggests that price changes occur in the market even though there is no current information generating process at work. Godfrey, Granger and Morgenstern provide a defense for this phenomena by noting how new prices are generated during times when actual transactions, on the basis of new information,

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[13] Michael J. Godfrey, C.W.J. Granger, and O. Morgenstern, "The Random-Walk Hypothesis of Stock Market Behavior," Kyklos (1964), p. 23.

are impossible, i.e. over weekends for example when the exchange facilities are closed.

A strong argument then can be made against the assumption of an efficient or perfect market in the random walk theory. The arguments above suggest that some systematic price behavior must exist in the market. The remarkable result, though, is that the very actions of all the competitors - chartists, fundamental analysts, and naive buy-and-hold investors - in trying to determine this systematic behavior creates the randomness in stock prices. Explaining why this occurrence should, and does, take place is a difficult matter and can be reconciled only by resorting to crude, theoretical assumptions.

A safe assumption is that investors react to information by forming expectations about what the intrinsic value of a stock should be in the market. There is not much doubt that rational investors are continually re-adjusting their expectations as they receive information. This may be done before or after its appearance is dispersed through the market. Of course the causal factors behind how the expectations are formed are not known. It is not unreasonable to suggest, however, that some of the stimuli associated with these expectations originates from past knowledge - particularly data emanating from financial statements of past periods. The expectations are revised of course in light of the information contained in current financial statements. This idea is consistent with the Cyert and March incremental approach to decision-making mentioned in Chapter III.

To carry the argument one step further, investors' expectations could partly arise from their evaluation of management. Certainly the

management of a firm plays a key role in the resource allocation process. The assets that management acquires and the way they are employed affects both periodic income and the potential earning power of the firm. Thus a strong argument could be made for linking the actions of management to future stock prices. If this is in fact the case, then it is worthwhile to set up a reporting system such that investors can evaluate the actions of management. Segmented financial reports would facilitate reporting this type of information.

The problem which arises though is that investors would prefer to know what management is going to do in the future. While it is not the purpose of accounting to predict future outcomes, perhaps external reports can be prepared to reflect the current significance of management decisions. This issue is pursued further in Chapter VI.

Basis for Diversification

With a hostile environment facing the investor combined with intrinsic values of stocks and the random behavior of price changes, investment decision-making is a complex process. But just because the above conditions exist in the investor's environment is no reason to abandon intelligent efforts at coping with the situation. The evidence supporting such a proposition must be cast in a normative manner, but this does not invalidate its applicability to investor decision-making in the real world. The essence of information still assumes a vital role in remedying some of the problems.

Normally, the decision process of investors is directly linked to the selection of a portfolio of stocks and not merely the selection of the one best stock. The rationale here was examined in detail in the previous chapter. To reiterate briefly, in portfolio selection

there is variability associated with any of the expected means for different securities. The problem, it will be recalled, is not just a matter of selecting securities with the largest expected return. Of equal importance in the selection process, is the amount of risk associated with each expected return.

Now the arguments set forth in the random walk theory do not refute the principle of diversification. As Markowitz noted in his model, investors can be considered risk averters and therefore rational investors must consider their level of aspiration, i.e. their goals, in conjunction with both expected return and risk. In a random walk market then, one must not conclude that the selection process itself is random merely because price changes are independent. This would be the case if expected return were the only variable of significance. In fact, risk cannot be ignored, and furthermore, because it is a crucial variable influencing the net returns of any method of investment, the random walk theory lends credence to diversification.

The fundamental idea behind diversification is that it reduces the variability of expected returns, not among the various individual stocks, but for the portfolio as a whole. At the theoretical level, the question which remains is what type of distribution characterizes changes in stock prices as a complete group. It is important to identify the type of distribution, if possible, since the dispersion about any given expected yields, i.e. the risk or probability of error, subsequently affects the derivation of the efficient set proposed by the Markowitz model. Thus the comments of Fama, as quoted earlier, assume some degree of significance. He submits that the variability of estimated expected returns is higher - and therefore risk is greater - in a stable Paretian market than in a Gaussian market. The evidence

cited by Fama also indicates that price changes in actual market conditions, conform to a stable Paretian distribution as opposed to the normal distribution used by Markowitz.

In the light of diversification, information serves a key role since estimates are required for the expected mean and the variance of each stock under consideration. What this involves in essence is an estimate of the current intrinsic value of the stock in order that a projection can be made of what the price will be at some time in the future. The most likely potential source of information on which to base such a projection are the financial statements of the companies in question.

One might advance the argument though, that all current and past information is irrelevant to the investment decision because of the following: (1) the intrinsic value of a stock can never be known for certain; (2) the earning potential for all firms is a random variable; and (3) the residual risk of a firm is a function of systematic risk which can never be eliminated in any predictive model. The first proposition, however, ignores the fact that current market prices are a very good approximation of intrinsic values. Furthermore, the author knows of no reference that offers evidence for the second proposition. The last proposition implies that the earning power, and therefore profitability, of all firms is equal. Historical data indicate that this is not the case. Not only are rates of profitability and earning power not equal among companies, but they also vary with the time dimension for each company. There is no reason to doubt that this type of phenomena will not continue in the future.

In sum, diversification is fully warranted and so are financial statements as a source of input information for forming expectations of risk and return in investment decisions. As Chambers remarks:

> All choices, including all choices of investors ... depend upon both information and expectations ... information on security prices influences choices ... expected dividend yields vary so prices vary, ... information on earnings yields and earnings per share influences the expectation of dividend yields .... Further still, information on the present composition of a firm's investment in business assets and the composition of its liabilities influences the expectation of safety of investment and the expectation of gains by way of dividends, interest and shifts in security prices.[14]

SUMMARY

This chapter examines the relationship between the nature of stock market prices and the corresponding role of information in decision-making. The behavior of price changes in the market is important for two primary reasons: (1) it establishes the validity of investor decision models, i.e. the rationale for diversification in the investment selection process; and (2) it highlights the significance of expectations in the decision process of investors and the necessity of financial statements as a source of information in forming these expectations.

Two major schools of thought are prominent among professional analysts in analyzing the behavior of stock prices for some criterion of

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[14] R. J. Chambers, "The Foundations of Financial Accounting," in Berkeley Symposium on the Foundations of Financial Accounting, edited by the Schools of Business Administration, University of California, Berkeley (Berkeley, California: University of California Press, 1967), p. 33.

predictability. The technical approach specifically utilizes internal market data based on the assumption that stock price changes are predictable from patterns of the past behavior of stock market prices. On the other hand, the fundamental approach also searches for some criterion of predictability but with an emphasis on phenomena external to the market mechanism itself. The implicit assumption common to both approaches is that dependency is a salient feature of successive series of price changes in the market. In reviewing the assumptions of both schools of thought, financial statements appear to serve an interest to the proponents of both schools of thought.

Challenging the entire efforts and thoughts of the professional analyst is the theory of random walks in stock market price behavior. Founded on the premise that stock exchanges are efficient markets, the hypotheses of independence in successive price changes and the conformity of such changes to some probability distribution form the core of the random walk theory.

Because of the nature of the noise and information generating processes inherent in the market environment, there is reason to doubt the validity of the efficient or perfect market assumption. A fundamental phenomena of the noise and information generating processes is its influence on the fluctuation of actual stock prices around their intrinsic value based on the expectations of each investor in the market. This remarkable effect, i.e. the activity of all the investors each trying to anticipate the intrinsic value of stocks on the basis of expectations, is what in fact contributes to the randomness of successive stock price changes.

Since the expectations of risk and return thus become the dominant variables of importance in investor decision-making, the usefulness of financial statements correspondingly acquires significance. In the first place, financial reports provide an objective record of earnings, dividends, and potential growth opportunities based on the composition of the firm's asset and liability structure. These variables form the base from which estimates of risk and return are drawn. Next, financial statements establish a standard of comparison by which expectations can be related to intrinsic values of firms. This is accomplished of course vis-à-vis current stock prices. Finally, although financial statements are the dictum of past information, they provide a means for evaluating the actions of management. The decisions of management should receive prime attention from investors since they effectively control the future gains or losses accruing to investors. This is only relative to the residual risk of the firms, however, since management has no direct control over risk inherent in the economy.

At this point, the discussion looks as if it has come full circle from the comments proposed in the beginning chapters and that segmented financial reports are justifiable. Unfortunately, this chapter has only served to indicate the validity of financial reports as a prime source of information corresponding to the needs of investors. The question of useful information must be extended one step further, however, to the quality of information provided in financial statements, the details of which are left to the next chapter.

CHAPTER VI

ACCOUNTING MEASUREMENTS AND INVESTOR DECISION-MAKING

Before embarking on other issues pertinent to the conglomerate disclosure controversy, it seems in order to recapitulate the issues discussed thus far. The conglomerate disclosure controversy involves whether or not segmented financial statements would provide information that is useful and facilitates investment decision-making. Chapter III explored the essentials of decision theory which were then integrated specifically with portfolio theory in Chapter IV. Taken together, these two chapters established the rationale underlying the following relationships: (1) decision variables and the financial statement items of capital, income and dividends; (2) decision criteria and the future prices of securities; and (3) investors' goals and risk and return. But these three relationships are interrelated and interdependent since the decision variables from financial statements form a significant portion of the basic framework from which future prices are estimated. Determining risk and return is in turn dependent on the estimates of future prices. Moreover, the previous chapter indicated that current expectations of risk and return are the vital link between investors' goal attainment and information from financial statements.

The above relationships clearly establish that financial statements are a vital source of information. But does this necessarily imply that the information emanating from such a source is useful? It will be recalled that, for information to be useful or have value, it must in some manner enable the investor to move in the

direction of goal attainment. This condition applies to information emanating from financial statements that are segmented or prepared on a total entity basis.

Again, it will be recalled from Chapter II that investors desired segmented financial statements in the case of conglomerates because of their diversified operations. In other words, investors felt that diversified companies engage in different investments that are of different risk classes, experience different rates of profitability during successive time periods, and could be expected to exhibit different degrees of current earning potential. The investors' claims implicitly assumed that because of these conditions, segmented financial statements would reveal important differences in them that would lead to improved decision making.

A closer examination of this implicit argument by investors uncovers certain problems. Assume momentarily that segmented financial statements are provided to investors. Assume further, that investors are able to identify and ascribe to the assets in these segmented statements different risk class ratings as suggested in Chapter IV. Does this knowledge alone enhance the investors' current expectations of return and risk? The most probable answer to this question appears negative since it is not the risk class or the nature of assets that solely determines the behavior of future prices. Nor is it necessarily the current earning power of the assets that determines the behavior of future prices. Rather, it is the way in which the assets are utilized which largely influences future prices because this generates income which in turn maintains capital and provides a

base for dividends. But the way assets are utilized is subject to the stewardship of management. Thus, the power of management over the control of asset utilization becomes a crucial factor relative to investor decision-making.

It seems clear, therefore, that segmented financial statements must provide information that allows investors to evaluate the past and current actions of management in an effort to estimate what their performance will be in the future. Income and capital are two items in financial reports that permit investors to measure the efficiency of management. However, at this point, problems emerge in comparing management efficiency. First, the investor must be able to accurately compare each of the segments of a conglomerate company for any specific time period. Furthermore, any particular efficiency measure must be comparable over successive time periods for any specific time period. Finally, the investors' decision process by definition involves search activity that discloses different alternatives of investment opportunity. This means that inter-firm comparability is also necessary. Obviously, any validity which is attached to these comparisons hinges on what is meant by income and capital and how these two decision variables are measured. In fact, the validity of inter-firm and inter-period comparisons must hold in order for comparisons of segmented financial statements to have value.

To summarize these issues then, accounting data must meet two major criteria: (1) the decision variables reported in financial statements must effectively permit inter-period and inter-firm comparisons of any investor's expectations on a current basis, i.e. to

be useful, accounting information must be relevant; and (2) the adequacy of accounting data prepared for a specific period should allow comparability with the expectation originally specified by the investor for that period, i.e. to be useful, accounting information must be reliable. A proper evaluation of the conglomerate disclosure controversy rests on the assessment of these two issues since the origin of any validity in segmented reports is dependent upon what is appropriate for the total entity bases of reporting. This chapter reviews and examines different concepts of capital and income measurement. The specific purpose of the chapter is to illustrate the complexity of the measurement criteria problem in accounting and to note the specific shortcomings of the historical cost convention. It should be remembered, that the investors' claim for segmented financial statements, if satisfied, would necessitate conforming to current, generally accepted accounting principles - namely the historical cost measurement system.

THE MEASUREMENT OF ACCOUNTING INCOME

The idea of comparability, relevance, and reliability in financial reporting touches on the cornerstone of accounting - namely the measurement of capital, asset values, and profits. Different financial information will ensue depending on which concept of capital and asset valuation is used in the accounting process. Obviously, this development will necessarily have an impact on the investor's expectations.

Over the years, several competing schools of thought have

been advanced on how income should be computed. Currently, there is no general consensus on the "ideal" method - and rightly so - neither at the theoretical level nor at the practical level. A majority of the various advocates on income determination recognize that different circumstances of organizations and accounting objectives require different concepts of income.

Normally, the economic or subjective value of a firm is represented by the various equities or owners of invested capital. Several equity theories are prominent in accounting theory as a result of this basic relationship. However, Hendriksen suggests that "The problem of valuation and the most relevant concept of income are basically independent of the equity theory selected."[1]

There are two fundamental approaches to the measurement of income. One approach concentrates on the maintenance of capital and essentially, it involves a valuation process at the beginning and end of the accounting period. The second approach to income measurement consists of matching revenues and expenses with attention focused on the realization principle.

Concepts of Capital Maintenance

The difficulty in using a capital maintenance approach for income determination is in defining what constitutes capital. Once the ground rules for establishing capital are clear, then income is

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[1] Eldon S. Hendriksen, Accounting Theory (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 403.

simply the difference in capital measured at two different points of time. Invariably, capital must be measured in terms of some value, whether it be physical units of some description, or some expression of purchasing power. Whatever the case, the underlying postulates of accounting assume that any measurements of capital can be expressed and calculated in monetary terms.

One of the important preoccupations of investors in making inter-period comparisons of different firms is whether or not capital is being maintained. Certainly, if the capital of the firm is deteriorating, in spite of what the causal factors may be, it should be discernible from the information reported in financial statements. Otherwise, significant distortions are introduced in the investor's expectations of return and risk. This situation manifests itself for two possible reasons: (1) dividends received by the investor would constitute not a return on capital but a return of capital; and (2) such a reduction in the capital resources of the firm necessarily constricts the earning power and therefore, the future benefits accruing to the firm. Both of these conditions add up to reflect a reduction in the total value of the firm which in turn, is subsequently transmitted to stock prices. Thus the capital employed and retained in the firm is vital knowledge for investor decision-making. The inescapable question at this point is how to define capital - particularly a definition that is relevant and useful for investors. Unfortunately, the answer is not singular; several different definitions are available, not all of which serve the best interests of the investor.

A convenient starting place for defining capital maintenance is to assume that a shareholder invests a certain number of dollars in a firm. Under the historical cost convention of accounting, capital is maintained if there is the same number of monetary units on hand at the end of the period as there was at the beginning. Income is measured only after the investment in monetary units is recovered.[2] However, in a dynamic economy there is the formidable problem, not only of inflation, but as well, of changes in the prices of various assets, however defined. The question of inflation concerns the changing value of the dollar which directly influences the purchasing power over goods and services in the economy. The idea of price changes in assets, however, is a different matter and relates to the supply and demand effects arising from factors such as technology and the productive capacity of assets. For those proponents who wish to account for the maintenance of capital solely on a historical cost basis, changing prices and price level adjustments present no problem. However, it is difficult to imagine how such accounting can generate relevant information for investor decision-making.

A second general concept of capital maintenance would therefore recognize the aspect of purchasing power. Thus, the original capital contributed to the firm would be adjusted by some general index of purchasing power. The question which remains though, is whose purchasing power is to be accounted for and what is the appropriate index? There is a diversity of thought on this question in

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[2] Keith Shwayder, "The Capital Maintenance Rules and the Net Asset Valuation Rule," The Accounting Review (April, 1969), p. 306.

accounting theory, most of which revolves around two schools of thought - namely those with a proprietary viewpoint and those with an entity viewpoint. Gynther suggests that there are two common approaches which emphasize the former viewpoint.[3] The centre of attention for these proponents is on the shareholders and not on the firm *per se*. Consequently, one approach would employ a general price index to arrive at a general purchasing power capital maintenance concept. The second approach is narrower in scope and would employ a consumer price index to arrive at what Gynther calls the shareholder purchasing power capital maintenance concept.

In the case of the entity approach under the purchasing power concept of capital maintenance, attention is directed at the firm and *its* capital and *not* the shareholders and their funds. Here the emphasis is on the investment purchasing power of the firm but a problem arises though in determining an appropriate measurement index. Hendriksen points to three different positions that might be adopted for maintaining the investment power of the firm.[4] These include maintaining purchasing power for all investment goods which *each* firm is likely to purchase, or investment goods that firms in a *particular industry* are likely to purchase, or finally, all investment goods which *any* firm might purchase.

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[3] R.S. Gynther, "Accounting for the Effects of Changing Prices," a paper presented to the 18th Advanced Accountancy Seminar at Victoria University of Wellington, Wellington, Australia, August, 1969, pp. 12-18.

[4] Eldon S. Hendriksen, *op. cit.*, pp. 179-180.

A final category for defining capital maintenance emphasizes a current cost approach which Gynther refers to as the operating capacity of the firm's capital maintenance concept. This is also an entity viewpoint which "requires the capital to be adjusted as and when each asset is being revalued in accordance with price changes which are specific to it, and also when recording losses (and profits) incurred by holding net monetary working capital when prices are rising (falling)."[5]

Asset Valuation Concepts

A second approach to measuring income rests in the adoption of some asset valuation rule which is used to measure the exchange transactions of a business entity. Shwayder points out that the fundamental distinction between net asset valuation concepts and capital maintenance concepts is that a capital maintenance rule "is necessary and sufficient for calculating lifetime income ... but not sufficient for calculating periodic income."[6] In essence then, net asset valuation is analogous to the concept of matching and realization with the objective of allocating lifetime income among accounting periods.

Like the capital maintenance concept, net asset valuation has important implications for investor decision-making. In the first place, a lifetime approach to computing income is not too meaningful for investors, particularly in light of the going-concern postulate of accounting. Investors need information for their purposes on a much

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[5] R.S. Gynther, op. cit., p. 18.

[6] Keith Shwayder, op. cit., p. 304.

shorter time basis. Normally financial reports are issued on an annual basis, with most of the larger corporations issuing quarterly reports. However, it is contended here that, not only are investors in need of information conveying the real economic position of the firm, but as well, they need information with which to assess the efficiency of management. This is evident in that some measure of success or failure of management, and the factors contributing to this effect, can provide possible clues for the investors' expectations of risk and return. Consequently, the sources or causes of net income are important to investors, and since the valuation rule used determines how and what income is reported in financial statements, it would appear to be of paramount significance.

The traditional accounting approach to asset valuation is historical cost. Assets are recorded at their initial input value and then they are matched against current revenue as it is earned. Several suggestions have been advanced in the accounting literature that would still use initial input values as a base, but adjusted for changes in purchasing power. For example, Sprouse and Moonitz[7] advocate a net asset valuation rule based on specific price level adjustments. On the other hand, the views expressed by Accounting

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[7] Robert T. Sprouse and Maurice Moonitz, A Tentative Set of Broad Accounting Principles for Business Enterprises, Accounting Research Study No. 3 (New York: American Institute of Certified Public Accountants, 1962).

Research Study No. 6[8] favor a valuation rule based on general price level adjustments applied to historical costs.

Input values are not the sole means available for asset valuation - income determination. Edwards and Bell,[9] for example, consider entry values, which includes present cost and current cost, in addition to exit values, as alternative bases for asset valuation. In a somewhat provocative volume, Chambers[10] argues for what he calls the "current-cash-equivalent" concept of asset valuation.

One observation from the above discussion should be made explicit. For accounting purposes it is possible to combine any asset valuation concept with a corresponding capital maintenance concept, i.e. an n x m matrix can be formed. Each segment so formed by such a matrix has different implications on net income, capital maintenance, and therefore investor decision-making. It is beyond the scope of this thesis to examine each segment in detail; such has been the effort of many volumes of accounting thought. Instead, it is the task of the following section to evaluate several alternatives mentioned

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[8] Staff of the Accounting Research Division, American Institute of Certified Public Accountants, Reporting on the Financial Effects of Price Level Changes, Accounting Research Study No. 6 (New York: American Institute of Certified Public Accountants, 1963).

[9] Edgar O. Edwards and Philip W. Bell, The Theory and Measurement of Business Income (Berkeley and Los Angeles, California: University of California Press, 1964), pp. 74-80.

[10] Raymond J. Chambers, Accounting, Evaluation and Economic Behavior (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966), pp. 107-120.

in the literature together with their possible ramifications on the comparability, relevance, and reliability of accounting information for investor decision-making.

EVALUATING ALTERNATIVE METHODS OF REPORTING FINANCIAL INFORMATION FOR INVESTOR DECISION-MAKING

Any attempt to justify segmented financial reports should recognize the advantages and disadvantages of the various valuation rules and how they affect the criteria outlined at the beginning of this chapter. Since Chapter V stressed the inter-relationship of current stock market prices, expectations of the investor, and the intrinsic value of the firm, a convenient starting point is the economic concept of value.

Economic Value: An Ideal Measure

The common interpretation of an asset's economic value is the discounted value of the future cash flows which the asset will generate. Under this interpretation, the economic value of the firm is equivalent to its intrinsic value. Thus, one accountant, in quoting the ideas of the economist J.R. Hicks, contends that the enhancement in the net present value of assets from one point in time to another, is the appropriate net income to appear in corporate financial statements.[11]

Such an approach to asset valuation and income determination would score highly in providing relevant information of current economic

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[11] Stephen A. Zeff, "Replacement Cost: Member of the Family, Welcome Guest, or Intruder?," The Accounting Review (October, 1962), p. 620.

significance for two reasons. In the first place, the dollar figures reported from period to period would be in units of an equivalent base among all firms. Therefore, ratio analysis and other modes of comparison which an investor might adopt could be considered extremely meaningful in themselves. Secondly, management success, in terms of realized income, would be readily apparent through a comparison of the financial reports of different firms over a series of time periods.

However, providing financial reports prepared according to economic standards is questionable when the aspect of reliability is considered. Hendriksen suggests that the subjective expectations of estimating future cash flows, determining the useful life of an asset, and choosing the appropriate discount rate, seriously limits the economic approach for accounting purposes.[12] Moreover, although the economic approach does provide a measure of capital maintenance, "It does not provide information useful either for measuring management efficiency or for predictive purposes."[13]

Still at the conceptual level, there appears to be some disagreement among accountants, that applying an economic method to the valuation of assets will not necessarily determine the real value of the firm. Donald Corbin submits that valuations summed for each individual asset will not usually agree with a valuation of the firm

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[12] Eldon S. Hendriksen, op. cit., pp. 104-107.

[13] Ibid., p. 107.

as a whole.[14] The discrepancy of course is the proverbial accounting concept of goodwill. At the same time, Corbin expresses the view that using original cost figures instead of attempting to value assets may lead to meaningless or misleading financial reports.[15]

Historical Cost as a Basis for Valuation

The conventional accounting approach to asset valuation has its roots in historic costs or the initial acquisition price paid by the firm for productive assets. Under this approach, invested capital is maintained by accounting for the changes in the number of dollars available for distribution to shareholders by way of dividends or retainment in the firm for expansion without depleting the original number of dollars invested. Furthermore, income is largely determined by adhering to the accounting principle of "realization", since the criteria used to measure asset expiration and to recognize revenue are objectively verifiable. Unfortunately, a variety of comments and opinions have emerged from accountants debating what exactly is meant by objectively verifiable, but these thoughts are beyond the present scope of discussion.

Not infrequently, the historical cost convention is criticized as a base of providing relevant information in financial reports for

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[14] Donald A. Corbin, "The Revolution in Accounting," The Accounting Review (October, 1962), p. 629.

[15] Ibid., pp. 629-630.

investors. A disturbing aspect to some "revolutionaries" in accounting is that historical costs do not reflect in any way the actual conditions of a dynamic economy that bear on accounting data. Expressed differently, the dollar as a unit of measure is variable when inflationary or deflationary conditions are prevalent in the economy. History adequately reveals that the economy is not stable and that the arguments of the revolutionaries against historical cost, unadjusted to reflect these changing conditions, appear quite valid. Gynther[16] interprets some of the harmful features of external financial reports based on conventional historical costs to be:

1. Profits are overstated because depreciation is understated in times of rising prices, costs of goods sold are also understated, and losses incurred by holding monetary assets are ignored.
2. Historical costs lead to most assets being undervalued.
3. As a result of points (1) and (2), the return on investment calculation is overstated.
4. Evaluations of management and divisional performances are, at best, incorrect.

The impact of these effects on investor decision-making appears to be straightforward. If the value of a dollar is constantly changing, and assuming that the distortions in accounting data are serious because of this, then inter-period and inter-firm comparability is destroyed. Moreover, the data for any one firm is irrelevant in terms of current economic significance and management efficiency cannot be properly evaluated due to distorted and meaningless income figures.

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[16] R.S. Gynther, op. cit., p. 4.

Thus, the investor would seem to be severely handicapped in using such data to estimate the future earning power of the firm and the probable success or failure attributable thereto.

While the criticisms against historical cost as a basis for providing relevant data for investor decision-making are harsh, the use of historical cost does have some merit. In terms of objectivity and therefore reliability, the historical cost convention is second to none. The rebuttal to this claim is that accounting data should be approximately correct rather than precisely wrong in light of the intended purpose of its users. But even on this issue, there is ample disagreement among accountants as to how to be approximately correct.

Adjusted Historical Cost

Because of its close connection with historical cost accounting, many accountants have opted in favor of price-level adjustments with the ultimate objective of recognizing changes in the purchasing power of the dollar. The significance of adjusting accounting data for price-level changes is exemplified by Perry Mason's assessment of the problem:

> ... without adjustment of the figures the income statement suffers from price level changes by the lack of comparability of the accounting figures ... and from the resulting diminished significance of the reported net income. The balance sheet also suffers from lack of comparability ... since they are almost always a hodge-podge of various past period dollars representing different amounts of purchasing power over commodities and services.[17]

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[17] Perry Mason, Price-Level Changes and Financial Statements (Evanston, Illinois: American Accounting Association, 1967), p. 11.

Hendriksen further adds that the concept of purchasing power assumes its validity from the accounting objective to distinguish between invested capital and income.[18] Thus, the capital maintenance concept takes precedence in determining income.

At this point, however, the purchasing power concept becomes somewhat controversial. Hendriksen sums up the main question:

> Does it refer to some generalized purchasing power, the purchasing power of stockholders as consumer, the purchasing power of stockholders as investors, the purchasing power of the firm as a buyer of either productive factors or investment goods, or the ability of the firm to replace its capital assets with assets of the same type or with the same productive ability?[19]

Hendriksen advocates that the general investment purchasing power of all industries is a more appropriate measure than general or specific purchasing power measures. This is because of the difficulty in defining specific industries, allocating firms to these industries and the actual and potential mobility of firms among industries.

In an attempt to account for the changing price-level, Accounting Research Study No. 6[20] recommends the use of a general purchasing power index to restate original historical cost figures in financial reports. Such a procedure, it surmises, offers a sound basis for improved comparability in that:

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[18] Eldon S. Hendriksen, "Purchasing Power and Replacement Cost Concepts - Are They Related?," The Accounting Review (July, 1963), p. 484.

[19] Ibid., p. 484.

[20] Accounting Research Study No. 6, *op. cit.*

> ... the results of operations and financial position will be stated in terms of the same "common dollar", a calculation of a rate of return on invested capital can be made in which both numerator and denominator are expressed in the same units.[21]

Although there are technical and statistical problems in choosing a proper index, the validity of the purchasing power concept would appear to be of substantial merit in reporting to shareholders. Again, however, some accountants think differently. Jean St. G. Kerr, for example, maintains that "the adjusted historical cost concept does not result in a measure of real income."[22] Furthermore, Mathews contends that unless changes in specific prices are considered, as opposed to price-level changes, the resulting data is meaningless.[23] In fact, not only is relevant information omitted by adjusting solely for price-level changes, but inter-period and inter-firm comparability is not enhanced in the least.

Current Cost and Replacement Values: Alternatives to Asset Valuation and Income Determination

In recent years, a number of accountants have questioned whether historical cost is the appropriate frame of reference for asset valuation and income determination. In doing so, these people have not always been explicit in their interpretations of current cost and replacement cost when advocating these ideas in financial reports.

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[21] *Ibid.*, p. 15.

[22] Jean St. G. Kerr, "Three Concepts of Business Income," *The Australian Accountant* (April, 1956), p. 45.

[23] R.L. Mathews, "Price-Level Changes and Useless Information," *Journal of Accounting Research* (Spring, 1965).

For Hendriksen, current costs could refer to the original historical costs adjusted by an index of general investment purchasing power.[24] On the other hand, Edwards and Bell[25] would recognize current market buying prices as representative of current costs while Chambers[26] would view current costs in terms of current cash equivalents. In each case, current cost has a different conceptual meaning and therefore varying implications for financial reports.

Replacement costs also have come to inherit different connotations. Hendriksen suggests the following possibilities:

> The term has been used to mean the anticipated cost of replacing an asset when it will be retired, the current cost of replacement of precisely a similar asset or building in the same location; the cost to obtain an asset that will provide the same service ... and the original cost adjusted by specific cost indexes.[27]

Although there are conceptual differences between replacement cost and current cost, Snavely[28] nicely summarizes the benefits that might be considered applicable to both concepts:

> 1. Holding gains and losses would be recognized and reported separately from operating income.
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> 2. Holding gains and losses would be recognized in the period when the change in value occurs, rather than in the period when the asset is sold.

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[24] Eldon S. Hendriksen, op. cit., pp. 483-491.

[25] Edwards and Bell, op. cit., p. 79.

[26] Raymond J. Chambers, op. cit., pp. 118-120.

[27] Eldon S. Hendriksen, op. cit., p. 486.

[28] Howard J. Snavely, "Current Cost For Long-Lived Assets: A Critical View," The Accounting Review (April, 1969), p. 434.

3. Assets would be valued, on the balance sheet, at amounts representing their current economic significance.

4. Calculations of rate of return would be more meaningful than those calculated under the historical cost convention.

5. Inter-period and inter-firm comparison would be facilitated.

It should be noted, though, that lifetime income is equivalent under both a current cost system and the conventional cost system. The major difference lies in the timing of net income reported and the segregation of holding gains and losses from operating income.

As expected, though, faults appear to exist in a current cost or replacement cost method. Snavely protests that unless "realized" gains are separated from the holding gain reported on the income statement (as recommended by Edwards and Bell) a holding gain could be shown when in fact there should have been a loss reported.[29] Snavely further adds that a current cost system does not generate relevant data because real asset values and real holding gains and losses are not recognized. For these reasons, inter-period and inter-firm comparability is subject to serious distortion. These appear to be moot observations, but nonetheless justifiable at a conceptual level.

It seems that the arguments by a majority of the accounting critics tend to visualize a singular measurement system as the most appropriate for determining asset valuation and income determination.

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[29] Ibid., p. 438.

Interestingly, Mattessich[30] suggests that a dual valuation basis is indispensable if the accounting information system ought to serve investment decisions. In particular, the most useful combination would involve a combination of the present value basis of valuation with some market value basis. This would effectively match the expected cash flows from an investment decision with the input costs. Such a system, based on both subjective and objective measures, would seem to have the potential of facilitating investors' evaluations of management decisions. However, there is still the problem of obtaining some consensus as to the method of incorporating each measurement system. The difficulties involved have already been outlined separately.

The above discussion by no means exhausts the intricacies and the complexity of thought in moving from the traditional accounting conventions toward a more ideal system of reporting information. Some accountants might take issue with the factors discussed above and suggest that other matters are more important. For instance, abandoning the historical cost convention means increasing costs in terms of time and money. Admittedly, a new system would incur tremendous set-up costs. Efficiency would probably be reduced initially and preparation time would undoubtedly take longer. With the availability of computers, however, the time factor can probably be discounted in the long-run.

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[30] Richard Mattessich, "On the Perennial Misunderstanding of Asset Measurement by Means of 'Present Values'," Cost and Management (March-April, 1970), pp. 29-31.

Jones even goes so far as to state that: "Whatever the cost of the new system ... it could hardly exceed the incalculable costs arising from reliance on biased and inaccurate information at critical periods of economic adjustment."[31] Realistically, though, the cost of information must be less than the accruing benefits.

In sum, there is substantial controversy among accountants concerning the best measurement criteria for asset valuation and income determination. Some of the issues are clear-cut and straightforward; other issues represent moot points which could lead to unforeseen difficulties if implemented. One apparent dichotomy emerges which seems to represent a real dilemma. Each step in the direction of providing current, relevant data in financial reports is simultaneously a step, or a portion thereof, removed from objective, verifiable, and thus reliable data.

SUMMARY

It is evident from previous chapters that financial statements are a vital source of information. However, this aspect alone is not sufficient for investment decisions. The more significant variables of income, capital, and dividends, must be relevant and reliable. They should also permit comparisons among firms, and between time periods, that are meaningful. If these conditions are not satisfied, the possibility of investor goal attainment is seriously thwarted.

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[31] R.C. Jones, Financial Statements and the Uncertain Dollar, The Journal of Accountancy (September, 1935), p. 197.

The purpose of the chapter is to disclose the diversity of viewpoints concerning the most appropriate concept of income and capital that ought to be used to measure the economic operations of the firm. The objective of contrasting these viewpoints is to specifically cast light on the significant shortcomings of the historical cost system. The reason for focusing attention on the deficiencies of the historical cost system in relation to income and capital is relatively straightforward. If the costs associated with providing financial statement information on a total entity basis are greater than the apparent bebefits then, normatively, segmented statements can be seriously challenged. Unfortunately, because of the controversy among accountants concerning alternative measurement systems, it is equally difficult to render an opinion as to which alternative(s) would contribute the greatest benefits in view of the costs involved.

The reason that problems of comparability, relevance, and reliability arise in connection with accounting information is due to different interpretations which are attached to the concepts of capital and income. Depending upon what capital and income are meant to represent will correspondingly affect the absolute figures appearing in financial reports. This in turn affects the judgment of investors since they rely on these figures for decision-making purposes.

There are two common theoretical methods for measuring accounting income, namely the capital maintenance approach and the asset valuation approach. The former approach adopts the position that capital must be maintained before income can be determined. Furthermore, capital can be maintained from the entity's viewpoint or the

shareholder's viewpoint. The asset valuation approach is based on the exchange transactions of an entity and therefore involves the matching of costs with revenues. In either case, differences of opinion exist on how to account for capital within a dynamic economy of changing prices and changing price-levels.

In the capital maintenance approach the center of attention is on determining life-time income. The asset valuation approach, however, concentrates on the allocation of income to specific accounting periods. This method of determining income also faces the problem of a changing economy. As a result, the following methods of asset valuation are prominent in the literature: (1) historical cost; (2) price-level adjusted historical cost; (3) current cost; (4) replacement cost; (5) current values based on market selling prices; and (6) discounted future cash flows.

It is feasible to combine any capital maintenance concept with a corresponding asset valuation rule. Obviously, each different combination produces balance sheets and income statements which measure different phenomena. At one extreme, historical cost financial statements are based on objective, reliable data but they do not reveal relevant information. A discounted future cash flow approach is at the other extreme. Financial statements based on this approach are relevant and comparable, yet they are very unreliable. Within these two limits there are other alternatives but they too have advantages and disadvantages.

In sum, one theme seems to emerge from the arguments in the literature. One income concept or one capital maintenance concept

will probably not suffice for investor decision-making. For example, net operating income, after removing the effects of inflation and changes in supply-demand prices, is important information for evaluating management. But such a system would require a departure from the historical cost convention which would destroy some objectivity in the reported data. Yet, the alternative systems would appear to be preferable because they offer considerable improvement for relevant and reliable comparisons.

CHAPTER VII

CONCLUSION AND SUMMARY

CONCLUSION

The major conclusion of this thesis is that the demand by investors for segmented financial statements is not warranted under the current state of generally accepted accounting principles. This conclusion is basically the result of evaluating two key issues: (1) does knowledge of a firm's past and current profitability, risk class of assets, and current earning power, enhance investors' goal attainment if the information is available on a segmented basis?; and (2) is it feasible to incorporate some measurement criteria which is capable of accurately conveying this knowledge?

From the analysis in this thesis, the answer to the first issue is affirmative since information of this type is equivalent to reducing the uncertainty about the quality of management. Having access to a source of information by which to evaluate the decisions of management is crucial to investor decision-making. This deduction is based on the simple fact that management has effective control over the current and future utilization of a firm's assets. Efficient asset utilization is the essence of generating future income streams. More importantly, the only feasible manner of rationally estimating the magnitude and consistency of this income stream is for investors to form a judgment about the calibre of management. Actually, this entire evaluation process by investors is transformed into expectations of risk and return. Through the process of diversification, investors can in fact use this knowledge to enhance their goal attainment by minimizing

distortions in forming estimates of future price behavior and, consequently, reducing their error in expectations of risk and return for a portfolio of securities. In serving this end, segmented financial statements are clearly an indispensable source of information for investor decision-making.

Resolving the second issue systematically follows from justifying segmented financial statements as a legitimate source of information for investor decision-making. Specifically, the measurement criteria used to quantify the economic operations of a firm must allow investors to correctly evaluate the actions of management. To fulfil this objective requires a measurement system that encompasses certain conditions. Since the investors' decision process involves a choice from among alternative investment opportunities, it is insufficient for them to solely compare the different segments of a single conglomerate in evaluating management. There is the further need of inter-firm and inter-period comparisons. Two implications of segmented financial data are evident in order for investors to accomplish this task. First, financial data must be relevant which means that it ought to reflect the current economic position of the firm. In the second place, the data must be reliable. For data to be reliable it must consistently convey what it is intended to represent. In the case of financial statements, this means that the concepts of capital and income must be precisely defined and clearly understood by investors; otherwise, there is no valid base for using such variables as indicators or surrogates of management efficiency. Clearly, any other financial statement variables that investors may choose to evaluate management

with, assume their validity within the context of defining income and capital. Unfortunately, financial statements prepared under the historical cost system are suspect because they cannot adequately fulfil these requirements. Therefore, it is extremely doubtful that segmented historical cost information significantly reduces the distortion in investors' expectations of risk and return for a portfolio of securities since meaningful evaluations of management on a current, comparative basis are seriously inhibited. In reaching a conclusion then, the adequacy of the measurement criteria employed in segmented financial statements assumes top priority in valuating the conglomerate disclosure controversy.

To summarize these concluding arguments, the historical cost convention of accounting is fundamentally deficient as a measurement criterion for conveying information in segmented financial statements that is useful and facilitates investment decision-making. However, the demand for segmented financial statements as a vital source of information for investment decision-making is legitimate and justifiable. Financial statements contain the key decision variables which are pertinent to investors' goal attainment. But unless these variables, on an entity basis, permit meaningful inter-period and inter-firm comparisons, give some indication of the current earning power of the firm, and allow management to be properly evaluated, their breakdown will not contribute useful information which facilitates investor decision-making. Thus, the adequacy of the measurement criterion used to convey information assumes precedence in evaluating the conglomerate disclosure controversy.

The concluding remarks above are unduly restricted by a limitation posed in the initial stages of this study. Investors' demands for segmented financial reports, particularly in the case of conglomerate companies, were evaluated within the framework of generally accepted accounting principles. However, this does not invalidate an expression of opinion at this point with reference to the current state of generally accepted accounting principles.

It is disturbing to think that potential benefits to investors must be denied because of a deficient measuring system in accounting practice. A portion of the difficulty, however, is embodied in a myth which a majority of investors adhere to in the real investment world - namely that segmented financial statements on a historical cost basis are the answer to their decision problems. Ironically, investors are certainly correct in identifying segmented data as being vital to their needs, but not if it is reported on a historical cost basis. This is not to suggest that segmented historical cost data are completely without utility. On the contrary, there is some merit in the fact that knowledge of a segment's proportionate contribution to net income does have an impact on investors' expectations of risk and return. This is especially the case when such information is combined with future expected trends in various industries in the economy. However, the benefits to investors from any reduced distortions in expectations would not appear to offset the costs associated with adopting a segmented historical cost system permanently.

If the historical cost system is not acceptable by itself for segmented reports, several important questions arise. At what

point should the transition be made from a historical cost system to an alternative? And, secondly, if the transition is made, what is the most likely candidate for a measurement system? The answer to the first question can be expressed in general terms. The transition should be incorporated when the total benefits of introducing a new system are greater than the costs of implementation. From the analysis of this study, the evidence in favor of some transition appears substantial. In fact, the alternative should favor a multi-dimensional measurement system incorporating the legal aspects of acquisition costs and current replacement costs.

The reasons for favoring such a multi-dimensional system for segmented reports stem from the following considerations. To begin with, the historical cost system does serve an important role under the current corporate taxation system. Any allowable deductions for tax purposes are based on acquisition costs which become the legal cost structure applicable to corporations. For the tax system to function properly, it is imperative for a system of accounting measurement to exist which is objectively verifiable through time and which permits accurate and consistent reviewability. The historical cost system not only fulfils these requirements but, concomitantly, serves as a means for checking and controlling the integrity of management.

A current cost system, using replacement costs, would recognize the current economic significance of management's actions. The financial statements would reveal the matching of current production costs with current period earnings. Moreover, the maintenance of capital would be facilitated, the economic position of the firm would be expressed in current values, and comparability among firms and

through time periods would be enhanced. Investors would therefore be in an improved position to evaluate the efficiency of management in asset utilization and to assess the improvements in technology from management's resource allocation process. These factors are particularly important information for estimating the probable future earning benefits accruing to a firm and hence to investors who supply equity funds to a firm.

Like any measurement system, the proposal for a multidimensional measurement system is not void of potential disadvantages. Certainly an improved system would have to be understandable to investors in order to realize increased benefits. Even more important, though, is the dysfunction of possible information overload. A multimeasurement system could jam the communication signals of investors in forming expectations of return and risk. Such an occurrence would nullify any significant benefits from introducing the improved system. Therefore, careful attention would have to be given to the format of segmented financial statements and the respective content.

To the traditional advocates of accounting, these opinions may seem quite harsh and not really worthy of attention at this stage of development in accounting theory and practice. For these antirevolutionaries, the solution to the conglomerate disclosure controversy is an indefinite rejection of the demands by investors for more adequate information. The fallacy in this viewpoint is not only dangerous to the future of the accounting profession, but it is also ignorant of the broader social implications of accounting. An inexhorable position that is not cognizant of these considerations could generate serious ramifications. For example, the penalty which investors suffer from

inadequate information represents third party costs to society in general. If these costs increase in magnitude and are unchecked, it is only a matter of time until legislative action is imposed on the external financial reporting system in general. The most probable result of this kind of action would be the enforcement of segmented financial statements on a historical cost basis since this is the measurement system which is currently accepted. Furthermore, since resistance to change is such a common phenomena in accounting practice, it is frightening to estimate how long it would take to replace a historical cost system of segmented reporting with an improved measurement system.

Rather than adopting a complacent attitude about the current conglomerate disclosure controversy, forthcoming positive action by the accounting profession is virtually mandatory. The results of this study, although normative, clearly provide a foundation for believing that the benefits from an improved measurement system could be substantial. Investors must be educated to appreciate an improved measurement system in accounting, and the profession itself must take the initiative to implement improved reporting systems.

SUMMARY OF THESIS

The main purpose of this thesis is to develop a theoretical framework as a basis for evaluating the conglomerate disclosure controversy. A deductive methodology is employed to integrate accounting theory with that of complementary disciplines. The root of the conglomerate disclosure controversy essentially involves accounting information and investor decision-making.

Unfortunately, the literature representing the demands by investors for segmented financial reports implicitly lacks a sound theoretical foundation. There is a complexity of issues involved apart from the mere breakdown of financial figures which is suggested in the literature. Yet, authoritative accounting spokesmen maintain that the purpose of accounting is to provide information that is useful and facilitates decision-making. From a normative standpoint then, establishing the value of information and what it means to facilitate decision-making provides a possible framework for evaluating the conglomerate disclosure controversy. Once these issues are resolved, it is then logical to assess the measurement criteria used to convey financial statement information.

To determine what it means to facilitate decision-making requires a brief overview of decision theory. The classical economic theory of rational man and the behavioral theory of rational choice constitute the principal theories of decision-making. The economic decision model assumes perfect information and therefore features wide search behavior, a complete range of given alternatives, and corresponding consequences for each alternative. The decision rule is simply to maximize the highest payoff. But the economic model is not suitable in describing the real world of investor decision-making nor the function of accounting information. Behavioral theories of decision-making stress a more realistic approach. They recognize a hostile environment with imperfect information and limited search behavior based on: (1) cognitive limitations of rationality; and (2) search scanning based on the degree of dissatisfaction. Thus,

alternatives are limited, unknown consequences exist because of restricted knowledge, and the decision rule is therefore one of "satisficing" the decision maker's aspirations.

Under conditions of uncertainty, information assumes a vital role to investors. They must adopt certain goals, search for alternative investments, and attempt to evaluate different consequences and payoffs from among available securities. To cope with these conditions in a hostile environment, investors require information that is timely, relevant, and reliable to their decision needs. Most important, though, is that to have value, information must be capable of allowing the investor to move in the direction of goal attainment.

General decision models, however, do not establish the decision criteria and decision variables specific to the investor's decision milieu. These characteristics must be defined to gain insight into the significance and usefulness of financial statement information. Portfolio theory provides the necessary framework.

The expected return-variance model developed by Markowitz closely parallels the real world dynamics of investment decision-making. Investors are considered to be risk adverse in the E-V model which corresponds to the concept of rationality in behavioral decision theory. This means that the investor wishes to maximize expected returns while simultaneously minimizing risk. In essence this process is the basis of diversification. A fairly rigorous mathematical analysis is required to fully exploit the rationale underlying diversification. Covariance, however, is the most salient feature emerging from the principle of diversification because it is the prime determinant of risk. To measure covariance it is necessary to estimate first the

expected return from a particular security and second the variability associated with the expected return. Expected returns are in turn a function of future stock prices combined with anticipated dividend flows.

There are several extensions of the model developed by Markowitz which contribute to an understanding of risk. In particular is the diagonal model originally developed by Sharpe and expanded further by Lintner. Lintner suggests that there are two components of the total risk in the environment. The first, systematic risk, is the variance which arises from the uncontrollable impact of market phenomena on expected returns. The second, residual risk, is variance which is attributable to specific company qualities such as management, and can be partially resolved.

Portfolio theory thus has direct implications for accounting information. In the first place, accounting reports can supply information to the capital markets for assessing the estimates of covariance of expected returns from a firm's assets. This has the effect of equating a firm's cost of capital, i.e. risk, with the risk attached to securities in the market. Information of this type reduces the uncertainty facing the investor and correspondingly increases the stability of an investor's portfolio. Thus, a base is formed for the suggestion that segmented financial reports may benefit investors. In addition, financial statements contain significant items such as income capital, and dividends, that are a source for estimating future stock prices and returns.

Theories pertaining to the behavior of stock prices lend further credence to financial statements being a vital source of infor-

mation for investment decisions. Professional analysts form one major school of thought relating to stock price behavior. All of their efforts at predicting future stock prices rest on the assumption that dependency exists in successive series of stock price changes. Random walk theorists on the other hand, seriously challenge the thoughts of the professional analyst by suggesting that future series of price changes are random. The implication is that throwing darts at a board would be just as effective in choosing securities as rigorous technical or fundamental analyses. This inference is valid only if future prices are random because of the "efficient market" hypothesis. In fact, future stock prices are random but this is due to the noise and information generating processes at work in the market. Specifically, it is the phenomena of investors' current expectations that causes actual stock prices to fluctuate randomly about their intrinsic values. Thus, expectations of risk and return become the dominant variable of importance in investor decision-making. Furthermore, the rationale underlying diversification becomes justifiable. Concomitantly, the usefulness of financial statement information acquires significance. They form an objective record of the major decision variables, provide a standard of comparison by relating the value of the firm to the decision criteria, i.e. future stock prices, and they permit an evaluation of management. All of these factors are directly relevant to the investment decision process.

Establishing the validity of financial statements as a vital source of information does not exhaust the issues to be considered in providing segmented financial statements. The question of what measurement criteria to use in the reporting system assumes priority

at this point. Specifically, accounting data should be relevant and reliable. In addition, accounting data must effectively facilitate inter-period and inter-firm comparisons in order to be consistent with the decision process of investors.

Unfortunately, there is little agreement amongst accountants concerning the measurement of capital and income. In theory, there are many combinations of capital maintenance concepts and asset valuation rules which attribute different meanings to the decision variables of capital and income. The major dispute is over the historical cost convention currently used to report financial data. But such data does not represent the current economic position of the firm, invalidates inter-period and inter-firm comparisons because of economic effects in the environment, and inhibits accurate evaluations of management. A departure from the historical cost convention, however, would partially remove qualities such as pure objectivity. While this would undoubtedly be the case, it is contended by most revolutionaries that relevant data is far superior to perfectly objective, but irrelevant, data. Exactly in what manner an alternative reporting system would affect the current expectations of investors, is a moot point.

AREAS FOR ADDITIONAL RESEARCH

There are innumerable areas for future study which this author uncovered while researching the literature for this thesis. Two areas in particular that relate to accounting information and decision-making are:

1. A study, similar in nature to this one, that focuses on other external users of financial statements. These other interests may include government, labor unions, and creditors such as banks and mortgage companies. Presumably, each of these users have different goals or objectives and therefore may emphasize different decision variables and decision criteria than investors. A most interesting aspect would be to consolidate the major similarities of all the decision needs of external users and adopt a new system of financial reporting to meet their purpose.
2. Assuming that a general purpose set of financial statements is definitely inadequate, research concerning the behavioral aspects of different methods of reporting the same information may be beneficial for improved communication. Individuals do react to the way data is presented, such as net income. Perhaps if the terminology was changed, financial statements might provoke a different reaction. This type of study would tie-in directly with the nature of investors' expectations, and would probably improve the intended purpose of accounting information.

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